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Watershed 96: A Brief Overview

Held June 8-12, 1996
Baltimore - Maryland

Watershed '96, held June 8-12, 1996, in Baltimore, Maryland, was a resounding success, fully exemplifying its theme of "Moving Ahead Together." Approximately 2000 people participated in the conference. They came from a variety of backgrounds, including public education, government, state and local groups, public and privately-owned utilities, environmental groups, researchers, public policy experts, and many others. Also, teleconference downlinks involved thousands of other participants at another 156 remote sites. The theme, "Moving Ahead Together" was realized not just through the number and diversity of participants, but also the range of conference activities and the manner in which conference participants worked together.

The conference opened with eight technical workshops on the first two days to educate watershed professionals. This was complemented by a watershed festival and an education symposium targeting the interests of both the professional and the public. The festival, called "Walking Through the Watershed," was co-sponsored by WEF and the Groundwater Foundation. It highlighted 30 activities that might be adapted for local festivals. A Watershed Education Action-Plan Symposium for Environmental Educators was hosted by WEF and funded by a grant from the National Fish and Wildlife Foundation. It generated a road map for future watershed education to be presented at the annual meeting of the North American Association for Environmental Educators.

Continuing on the conference theme, a series of interactive stakeholder workshops were held daily over breakfast to give hands-on experience with consensus building through watershed planning. Participants took on roles that gave them insights into the dynamics and challenges of stakeholder involvement. A watershed model was developed for these workshops and was used by participants to help identify, prioritize, negotiate, and resolve a range of issues related to watershed management.

The conference Technical Program was central to Watershed '96. Eighty technical sessions were held during the conference. Over 340 speakers provided comprehensive technical information. The major

tracks of the sessions included the following:

- Overview of the Watershed Approach
- Institutions, Relationships and Outreach
- Economic and Social Considerations
- Decision Making and Management Regimes
- Analytical Tools
- Watershed Enhancement Tools

A Conference Proceedings, including every paper that was presented, was distributed at the conference, and is still now available from the Water Environment Federation and on the Internet at www.epa.gov/owow/watershed/Proceed

The program also included two plenary sessions, luncheon speakers, and a satellite broadcast videoconference. The opening conference plenary, "Establishing a Common Goal: Sustainability" was moderated by Paul Freedman, President of Limno-Tech, Inc. and WEF conference co-chair. The session included remarks from officials and dignitaries. The keynote speech was given by Jonathan Lash, President of the World Resources Institute and Co-chair of the President's Council on Sustainable Development. The plenary also included a multi-media presentation using images from many of the technical presentations that would occur later in the sessions.

The second plenary session, "Getting Down to Business - Frameworks for Action", was moderated by Lawrence Selzer, Vice President of the Conservation Fund and Director of the National Forum on Nonpoint Source Pollution. Ralph Grossi, President of the American Farmland Trust and a member of the National Forum on Nonpoint Source Pollution, gave a keynote address. Mr. Selzer moderated a panel of innovative environmental managers who described the approaches their organizations are taking to get involved in watershed management. The panelists included views from corporations, states, Native American tribes, and local groups. The plenary session concluded with a large group response exercise that the U.S. Army Corps of Engineers designed to explore watershed views from the large and diverse group of conference attendees.

Participants were treated to an unexpected luncheon speaker, The Honorable Bruce Babbitt, the Secretary of the Interior, who gave a stirring speech on his experiences with people and groups doing watershed management. He had earlier heard some feedback about the conference while it was ongoing and decided it was such a landmark event that he changed his schedule specifically to come and express his ideas and encouragement to the conference attendees.

The conference closed with a plenary videoconference, "Watershed '96 On The Air: Achieving Results Community by Community". The videoconference was produced by Cornell University, through a grant from the USDA Cooperative State Research, Education and Extension Service. It was viewed by the live audience at the Baltimore Convention Center and at 156 downlink sites from around the continent. Forty states had sites, as did Canada and Mexico. Participants heard remarks from the Honorable Sherwood

Boehlert, U.S. Representative from New York, and Carol Browner, Administrator of the U.S. Environmental Protection Agency, gave the keynote address. Katherine Baril, from the Washington State University Extension Service, moderated the broadcast. The remainder of the broadcast examined four case studies of watershed management and restoration. Participants from downlink sites called and faxed questions that were discussed on the air. Many of the downlink sites had local programming surrounding the broadcast that featured discussions and speakers from their locality. The videos are available for purchase from Cornell University. Call 607.255-2090 or fax 607.255.9946 or e-mail Dist_Center@cce.cornell.edu.

The technical program included other elements that echoed the diversity and themes from the plenaries and other sessions, such as table topics, posters, and technology demonstrations. The table topic presentations were extremely popular. Fifty-three tables were filled with interested participants who took advantage of the unique opportunity to hear a presentation and have an informal discussion with the presenter and other attendees. Poster sessions were included for two days of the conference to accommodate the total of 68 posters. A technology demonstration area was also set up involving 16 organizations demonstrating the latest in computer technologies, including Internet access, GIS, modeling decision support and analysis, BMP evaluations, screening, and other interesting software. The conference also included an exposition of 57 exhibiting organizations (commercial, agency and nonprofit) utilizing 5,800 square feet of space.

Last, hands-on field trips were offered to examine many local watershed efforts up-close. Tours included a Patuxent River Watershed, demonstration cruises on EPA's Ocean Survey Vessel the peter W. Anderson, Druid Hill Park and Herring Run Park, Quail Creek, Chesapeake Farms Sustainable Agricultural Project, Kenilworth March Restoration, and Alexandria, Virginia's Delaware Sand Filter, Underground Sand Filter, and Bio-Retention Filters.

Watershed '96 was thorough in its content and participation, an exciting demonstration of its theme, "Moving Ahead Together". It brought ideas, information, and people together to further promote the use of watershed management as a better means to restore and protect our water environment. Watershed '96 was a success by all measures.

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Achieving Results Community By Community: A National Satellite Video Conference
Wednesday, June 12, 1996

Welcome to Watershed 96

Paul L. Freedman

Conference Co-Chair

Good morning! I am Paul Freedman, President of Limno-Tech and Co-chair of the conference for the Water Environment Federation, along with Louise Wise, my counterpart from the U.S. Environmental Protection Agency. We are honored to chair Watershed 96, and want to thank the dozens of people who helped in planning and organizing this event and hundreds more who contributed to the program.

It certainly is exciting to see so many people of such diverse interests gather together. As I greeted many of my colleagues and friends, I saw researchers, engineers, scientists, environmentalists, people from government, industry, citizen groups, even attorneys--all here because they're excited about watershed management.

This feels like a reunion. Not just a reunion after Watershed 93 (although many of you attended that conference), but a reunion in a larger sense--a 20 or 25-year reunification of professionals and citizens dedicated to preserving and enhancing the water environment.

Let me explain. In 1973, I began my career at a time of heightened focus on environmental issues, a time when the Clean Water Act and other major environmental legislation had just passed. I felt part of a unified team of scientists, engineers, regulators, and citizens, all working together to protect the environment. In the 70's and early 80's, we, as a team, made great progress.

The Great Lakes was a major emphasis for my early work and progress there exemplifies our success. For example, in my former hometown of Cleveland, Ohio, the Cuyahoga River no longer burns and is now a showcase for restaurants and nightclubs. Likewise, Lake Erie is now a major recreational resource for boating and fishing.

But with this progress began debate and division of this unified team. In the late 80's, we began to argue over methods and priorities. During this time, I felt we lost the unity of purpose and commitment I felt as a new graduate.

In the 70's, we focused on wastewater as the major culprit. But recently, environmental protection issues have become more complex involving nonpoint, landuse, habitat and complex socioeconomic issues. In fact, today in the Great Lakes the biggest and newest issues are habitat protection, agricultural runoff, and exotic species, a far cry from the wastewater controls we promoted in 70's & 80's.

This conference, however gives me a sense of new excitement. A sense of direction and reunification of effort. Here today, jointly promoting watershed approaches are those same adversaries who fought divisively about environmental priorities in the late 80's and early 90's.

I believe we, as a society, are coming to a new realization that water quality and environmental protection needs to be managed -not piecemeal but holistically by watersheds.

The watershed approach does this by examining all elements and factors in a watershed and incorporating all stakeholders in developing workable solutions that address true priorities. I truly believe the concept of watershed management represents a new paradigm for environmental protection.

Here today, we have a phenomenal conference, not just because of its comprehensive content and attendees, but because it is sponsored by 14 Federal agencies and dozens of cooperating organizations. In this modern era of government and politics, what other topic have you ever seen 14 Federal agencies actually agree on let alone embrace and promote?

Watershed protection provides the mechanism for us to move the next step forward in environmental restoration and protection, not by force of law but by consensus. Working together to establish common goals and common priorities.

This unified view is exemplified by the diversity of people and organizations at this conference all promoting the watershed approach. It is for this reason that I am excited.

Hence I view this as a reunion of the team that started a job two and a half decades ago and now has a new vision on how to complete it.

So again, welcome to Watershed 96.

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Establishing a Common Goal- Sustainablilty
Monday, June 10, 1996

Opening Remarks

Richard D. Kuchenrither, Ph.D., P.E.
President, Water Environment Federation

Thank you and welcome to Watershed '96, a monumental collaborative effort of the Water Environment Federation, 14 federal agencies, and many, many cooperating organizations.

Many believe water is our most important resource. Without clean water, there is no sustainable life possible as we know it. In searching for ways to sustain life and ensure adequate supplies of clean water, we have returned to the concept of watershed management.

I say returned because, as many of us working in the field realize, the concept of watershed management is not new. In fact, it is a very old idea.

John Wesley Powell was the founder of the U.S. Geological Survey in the late 1800s and a pioneer in the concept of watersheds. In his article "Institutions for Arid Lands," which was published in May 1890, Powell recommended that the political boundaries of the West should be coincident with the drainage boundaries. In the article, he stated "that the entire arid regions should be organized into natural hydrographic districts, each one to be a commonwealth within itself for the purpose of controlling and using the great values of irrigation.... The plan is to establish local self-government by hydrographic basins." Although Powell's idea was not implemented, it was as relevant then as it is today. Now we are gathered to discuss how to move ahead together with watershed management recognizing the great value the concept has for planning, protecting, and sustaining our water resources.

Profound wisdom comes not only from the founders of great institutions but also, surprisingly, from the purveyors of bumper stickers. I recently saw a bumper sticker which read, "Everyone has a mother and

everyone has a watershed." That's one way to get the word out.

The Water Environment Federation (WEF) is also very involved in getting the word out. WEF is a very active part of Water Quality 2000, the goal of which is to "develop and implement an integrated policy for the nation to protect and enhance water quality that supports society living in harmony with healthy natural systems." We know that the Clean Water Act has brought substantial improvements in the quality of our nation's waters. Our members recognize that further progress in enhancing water quality and protecting drinking water sources will depend on our ability to address many pollutant sources and adverse environmental conditions which fall outside the traditional water quality regulatory framework. This has led to a renewed interest in water quality planning and management on a watershed basis. The watershed approach represents a comprehensive and integrated strategy for protecting all water resources, including uplands, drainage basins, wetlands, and surface and ground waters. This approach has diverse support from water quality professionals, including the Water Environment Federation.

I would like to personally thank the program committee chairs, Paul Freedman and Louise Wise, the program committee, the WEF staff, and others for their tremendous efforts in putting together an exciting program for this conference. We have three action-packed, educational days planned for you.

Enjoy your conference.

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Establishing a Common Goal- Sustainability
Monday, June 10, 1996

Opening Remarks

Robert Perciasepe
Assistant Administrator for Water U.S. Environmental Protection Agency

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I am really pleased to help kick off this plenary session of the Watershed '96 conference here in Baltimore, my home town. Watershed 96 has a nice ring to it, almost as nice as Watershed 93, which is the last time many of us got together at the national level to assess how far we have come with watershed management. I see this event as one of the most important activities EPA will support all year. In our view, watershed management offers the greatest possible potential for significantly improving water resource restoration and protection.

Of course, it will not be enough to concentrate on these issues while we are here. We need to take back what we learn to where we work and to where we live, and to try to instill in others some of the ideas discussed here related to water resources management in the United States. I think that watershed management is a very important concept, one that we need to continue pursuing in a very aggressive way.

Importance of the nation's waters:

The reason that watershed management is so critically important and I think we've already heard some discussion along these lines is the importance of our nation's waters. Our water resources are critically important to this country, whether we are talking about drinking water, or about clean water for recreation, or about the role of water in the economic vitality of this country.

Just about two blocks from here, you see an inner harbor that has totally changed in the last 20 years, and in that respect Baltimore is similar to other cities that have recently looked to their waterfronts for

revitalization. Every year, over 20 million people visit this waterfront and the attractions there. The water still needs to be further improved, but it is making progress. This progress has enabled the kind of revitalization that has taken place, and a certain civic pride has developed from that.

Our vital drinking water supplies depend on clean water. Many economic sectors rely on clean water, including recreation and tourism, agriculture, commercial fishing, and manufacturing, which depend on clean water to deliver their products and services. Collectively, these sectors create jobs and generate billions and billions of dollars for our economy.

Our resources are at risk:

While we recognize the benefits that depend on clean water, we also recognize that our nation's waters are a resource at risk. Despite the benefits that we all accrue from clean waters, they continue to be degraded. The reality is that our waters are being stressed by multiple pollutants and activities from multiple sources.

Working with our partners, the states, EPA routinely does assessments of water quality on a national scale. The latest data from the states show that nearly 40 percent of the waters surveyed are still not safe for the basic goals that we have set for water quality not safe for fishing or swimming.

In fact, today, EPA is releasing this year's listing of fish consumption advisories around the country. The results show us that fish consumption advisories or bans are in effect in far too many water bodies around the country. In fact, the more we look, the more we find. This is a trend that must be reversed. It can only be reversed by looking at things holistically.

Importance of watershed approach:

This brings me to why the watershed approach and this conference is so important. Rather than focusing piecemeal on individual problems, the watershed approach involves looking across a watershed at all stressors. It involves looking at the harvesting of fish in the context of the sustainability of a particular watershed area; it means looking at all the sources of pollution, not just one source; it means greater public involvement in the making of tough decisions: All these things are embodied in the watershed approach, which provides a framework for managing our resources more efficiently and effectively.

Part of what makes this approach work is that it cuts across political jurisdictions. It cuts across levels of government federal, state, and local, and even sub-local to watershed associations and districts. All of that multi-level participation is required if we are going to look at things more holistically. Not only does the watershed approach cut across jurisdictions, but it continually changes the roles of all the players to deal with the long-term sustainability issues that are involved in managing watersheds. It challenges all of us to work together in different ways than we did in the 1970s and 80s. It emphasizes environmental results, not prescriptive measures.

Let me say at this particular juncture that one of the things that is extremely important to keep in mind when we are discussing watershed management and water quality and pollution control issues in the United States is that we have a responsibility to deliver a basic minimum level of protection across the country. It is upon that base that we build watershed management. It is not an excuse to do less, or to move more slowly. Watershed management is an imperative to build upon that base, that level playing field of pollution control in the country. That is a responsibility that EPA takes extremely seriously to make sure that this pollution control base is delivered efficiently. EPA's responsibility includes definition and ensured compliance with basic water programs, development of national standards and tools, funding, and national assessment of status and progress. Watershed management can complement these basic regulatory functions to help us achieve our basic water quality goals more efficiently and effectively.

Not a new idea, but the time is right:

As Dick Kuchenrither pointed out, the watershed approach is not a new idea by any means. We are not the first generation to recognize the value of managing our waters in a way that is consistent with an area's natural hydrology. Previous generations have used watershed management for a variety of reasons for example, water-supply planning; some of these past efforts have been successful, and some of them not so successful.

However, we are the best equipped to make the idea a reality. Today, we have technology that provides capabilities our predecessors could hardly imagine. We can sit at our computers and learn a great deal about what is happening in a watershed by evaluating and integrating all kinds of data. Technology continues to help us improve our capacity to deliver this kind of holistic approach.

For example, EPA is working together with the U.S. Geological Survey and other partners on an Internet-based Geographic Information System (GIS) called "Surf Your Watershed." You can see a demonstration of it here at the conference. The system is still evolving, but it is a good start towards making watershed information more widely accessible to a much broader audience of interested individuals not just the scientists and engineers although it contains plenty of information for scientists and engineers. It will allow folks in watersheds to find out the status of their watershed situation anywhere in the country. This is the kind of technology that did not exist 20 years ago.

There is no doubt that these new technical tools, whether in modeling or in the dissemination of information on the Internet, are important and are enabling us to get to the next level of watershed management in the United States. We must continue to invest in developing technical tools. But there is something even more important than technology, and that is the people in the watersheds. By harnessing the commitment of the people in a watershed, we get beyond the impersonality of some of our basic programs, such as the NPDES permit program, or effluent guidelines. These things are vitally important we can't build on them if they don't exist but they don't excite the public the way a watershed does. People can identify with their community, with their watershed.

When you are in Baltimore and you mention the Chesapeake Bay, I don't think you will find many people who don't know what you are talking about and why it is important. Notice the license tags that say, "Treasure the Chesapeake." People pay extra for those tags, and they appear all over in Baltimore and all over Maryland. This is just one indication of the kind of "people power" that can be brought to bear in watershed management and will be so necessary in making the tough decisions over the next 20 to 30 years. In watershed management, we need to have the kind of buy-in and recognition that comes with public participation. It's a different kind of power from technology, but one that is just as important.

Indications that progress is being made:

There are many indications that watershed management activities are escalating around the country. This has been especially true in the last three years, since Watershed 93. Let me mention just a few:

- More and more watershed associations and groups are coming together and taking action. Watershed issues are striking a chord not just with folks like you and me, but with all kinds of people from Chief Executive Officers of major U.S. corporations to farmers to school children to retired senior volunteers. There are very few things that attract that kind of diversity of people together at different levels, and we think this kind of diversity is a very important part of what watersheds are all about.

  The national "Know Your Watershed" campaign, which serves as a clearinghouse on watershed information, organizations, and events, tells us that the number of watershed groups registered with them has increased to roughly 700 right now.

  The coalition called "River Network" is dedicated to building citizen groups to speak out for rivers in every watershed across the country. They have a strategic plan called "Watershed 2000," and under it they are working to have 400 Citizen Watershed Councils in place by the year 2000, and 2,000 Citizen Councils in place by 2020.

- Watersheds are bringing about unexpected alliances between groups that do not necessarily have a history of working together. There are alliances between industry and environmental groups, between state and local governments, between a watershed council and a church. These unique alliances are going to be needed to solve some of the tough problems facing us in the future. That is why we need to keep building this watershed management foundation.
- Governments are learning and practicing the art of reinvention a notion that has been driving private sector productivity for some time and in so doing, helping to facilitate and advance watershed management on many levels. This kind of coordinated change is being called a paradigm shift.

At EPA, the paradigm shift has revolutionized a whole range of water quality programs. For example, our NPDES program the National Pollution Discharge Elimination System, which is the permit system for controlling point-source pollution is working to coordinate permits, monitoring, and enforcement on a

watershed-by-watershed basis, as opposed to a source-by-source basis. The drinking water program, which for too long has been disconnected from the surface water program, is now finding ways to connect with source-protection efforts that focus on watershed and aquifer-recharge areas. It is helping thousands of communities take watershed approaches to protecting both ground- and surface-water sources of drinking water. Our wetlands program supports holistic watershed approaches to wetland preservation and management. Our standards program is beginning to explore, through a national dialogue, how the standards program can be tailored to deal with watershed imperatives. I could go on. We are reconstituting the state revolving fund so that it looks at watershed priorities. The nonpoint source program uses watershed approaches in dealing with nonpoint sources.

Everything I've just mentioned has to do with the federal water program. There is also a great deal of innovation going on at the state level. In many cases, state water quality agencies are leading the way, trying out new ways of doing business, whether it be effluent trading such as that being practiced in North Carolina's Tar-Pamlico watershed, or tributary strategies here in Maryland for the Chesapeake Bay, or other watershed work. So far, it looks to us like 36 states are in the process of developing some pretty strong watershed approaches.

Closing remarks:

We can see a lot of progress being made. Increasingly, watershed management is moving beyond an idealized concept to a reality of working on a day-to-day basis in how we implement our programs and excite the public about the possibility of clean water in their communities.

This commitment must remain strong. You have to leave here as advocates of watershed management. You have to carry forward the message that by building on the base that we have developed over the last 20 years, we can achieve clean water in this country; we can achieve more than we've imagined if we all work together and concentrate on the task at hand. I trust that all of you will do that; otherwise you wouldn't be here. In addition to the conference attendance here in Baltimore, we are reaching out to communities with 150 downlink sites across the country for Wednesday's plenary session. It's exciting because these connections further the concept of community involvement in watershed management. Thank you, and I too wish all of you a good conference.

Establishing a Common Goal: Sustainability
Monday, June 10, 1996

Keynote Address

Jonathan Lash
President, World Resources Institute and Co-chair, President's Council on Sustainable Development

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Just three years ago, President Clinton established the President's Council on Sustainable Develop-ment in a Rose Garden ceremony on a blindingly hot, sunny day and appointed Dave Buzzelli and me as its co-chairs. We are, if nothing else, improbable partners. He is an engineer. I'm a lawyer.

Dave has spent his entire career at Dow. He is a senior vice president and corporate director, who is committed to his company.

I've spent my entire career essentially on the other side of a lot of issues. I was an environmental litigator with the Natural Resources Defense Council. I have also been a regulator and one not exactly perceived as an easy-going, compromising type.

Then, three and a half years ago, before I had been appointed to the Council, I arrived back in Washington to become president of an environmental think tank called the World Resources Institute. I was surprised to get a phone call from Dave Buzzeli inviting me to lunch. I didn't know Dave at all at that time. In the couple of hours we spent together, he talked about some of the things that Dow had been doing things that Dow's chairman, Frank Popoff, believed in. I talked a little about what I saw happening in environmental policy. He then surprised me by suggesting that I come out to Dow two weeks later and address their corporate board of directors.

So a couple of weeks later I found myself on a corporate jet saying to myself, What do I say to these people who I used to sue? I started out by saying, "I'm not going to say to you what I would have said 10

years ago, but then I don't think you would have invited me 10 years ago" and Frank Popoff, Dow's chairman, leaned over and said, "not even five."

Dave and I found ourselves in some ways joined at the hip as co-chairs of this council. We've learned a lot from each other. Our partnership is indicative of the membership of the Council and the way that we all learned to work together. The Council membership was diverse and distinguished: nine corporate chief executives from Fortune 500 companies, the leaders of several major environmental groups, representatives of Native Americans, civil rights, labor, and five members of the President's Cabinet.

The task the President gave us was to come up with a sustainable development strategy for the United States and also to identify examples of sustainable development in action around the country. I suspect that we could just have interviewed many of you in this room to get stories of sustainable development.

It's important to think about the context within which this Council was working. It's not much of a surprise to say that the politics of the issues included in the broad context of sustainability have been confrontational. They've been confrontational for two decades.

The legacy of confrontation has made it enormously difficult to find experimental and compromise solutions because generally the ground being discussed has been so hard-won. A second difficulty is that, in the past, we have tended to discuss issues in separate boxes. According to this kind of compartmentalized thinking, EPA's water office would not be expected to talk about air pollution issues or community issues or endangered species issues or economic growth. But how can you possibly address the kinds of issues that you all are here for watershed issues without understanding that you need to integrate issues that, historically, have been discussed separately.

Still a third difficulty has to do with the fact that since the beginning of our country, the genius of our political system has been its protection of individual rights and liberties. The basis of our economic system has been the satisfaction of individual wants and needs. And the core of our culture has been the recognition of individual achievement and performance whether Michael Jordan or the Marlborough Man. But the problems we're running up against now are problems of the community. That, above all, is what the President's Council on Sustainable Development sought to confront.

Three years ago, the members of the Council did not come to this task with a great deal of trust or shared experience. We finally began to overcome our differences when we began a search for some broad, shared values that we articulated as a set of principles that we could use as a basis for continuing with our debate. For example, the first on our list of 16 principles, or beliefs, that underlie all of our subsequent agreements is the following:

To achieve our vision of sustainable development, some things must grow jobs, productivity, wages, capital and savings, profits, information, knowledge, and education and others pollution, waste, and poverty must not.

Of course, the Council was talking about sustainability at the same time that Congress was talking about changing the environmental laws. Some members of the Council saw the proposed legislative changes as rollbacks and were deeply angered by that to the point of being reluctant to proceed with talking about sustainability while the foundation stones of everything they believed in were being tugged away. In the end, the Council as a whole reached an agreement that sustainability cannot proceed without that level playing field that is made up of the environmental laws and regulations of the last 20 years. It is important to acknowledge, we agreed, that the country has made enormous progress on the basis of those laws and regulations, and we continue to need that set of entry rules in order to build further progress.

We also agreed that, for the future, we need to build upon that foundation, to invent a different system. That agreement in principle between corporate leaders and environmental leaders was enormously difficult and enormously important and it freed us to begin a discussion of longer term goals in the country. That was a key juncture for us.

You know the section in Alice in Wonderland, where Alice meets the Mad Hatter and yells at him, "Which way should I go?" And he says, "That very much depends on where you want to end up, my dear." Much of our policy debate in this country, in the past, has involved a discussion of means before we decided on the ends. The Council tried to approach its task by looking at the ends, by starting with a 25-year vision of the United States on the path to sustainability. We developed a set of 10 goals for sustainability. The notion for each goal was to make a broad statement of direction for the country. For each goal, we also put together a set of indicators to show more explicitly what we mean and how we would measure when we got there. The first goal focused on environmental issues.

The next goal deals with what was one of the toughest issues for us the issue of economic growth. In general, it was a difficult task for our group to understand and begin to address the need to integrate economic, environmental, and social goals; it was difficult to recognize that, although we talk about all those things separately, they are really for people in their everyday lives separate strands in a single dream of a better life. Sustainability requires that we address those strands in an integrated way and develop not only a set of goals, but a set of policies that support the full set of goals rather than treating each of the goals as antagonistic alternatives.

Achieving sustainable communities is another goal that the Council articulated. Something we found whenever we left Washington and held meetings outside of the Capitol: There were enormous energy and activity and focus on integrated goals and integrated policies at the community level. We began to understand that it was at the community level that people still had some faith in their capacity to address issues through policy. It was at the community level where they could see the results of their experiments immediately, and where they could understand the connection between engagement, collective action, and better lives.

There were ten goals, as I said. We used the goals as a basis for developing a set of policy recommendations, which are essentially experiments with means of achieving the goals. There are 59 policy recommendations in the report; with them are 107 specific action items covering everything from environmental education to consumption to population to international leadership.

For example, one of the Council's recommendations is to create a new, alternative performance-based environmental management system. Back when I started working in the environmental field 20 years ago, as an advocate for the Natural Resources Defense Council, it was really impossible to track environmental performance. All you could do was send out a lab truck, take a sample and take it to the lab, and then you would know what was happening a week ago for one particular period of an hour or 24 hours which was no way to measure ongoing performance. Now, of course, all of that has changed. It is possible to measure and track hundreds and hundreds of substances at a parts-per-billion level on a continuous basis, to feed the information back into a computer, and to manage the system in real time. But our existing regulatory system, understandably, was built around the old problems. First of all, it isn't a performance-based system; it was built as an engineering system because we could enforce engineering standards back then. Second, the existing regulatory system reflects the fact that 20 years ago we were essentially in a confrontational period, in which we were seeking compliance by reluctant industrial entities.

Since then, there's been technological change and also political change. Some of the most important environmental progress now being made is coming not through command-and-control regulations, but from a whole set of other factors. The Council's recommendation to develop a new performance-based system represents the recognition by all parties that, in view of these changes, there is now a huge new opportunity to create a performance-based system that moves the regulator back outside the plant boundaries. This is an opportunity to put the focus back on what's most important, which is performance, to reduce transaction costs, and to get much more protection for the money. We also discussed the reality that it is ineffective to look at one piece of the manufacturing process and imagine that you can deal with a whole set of issues of concern to society.

The Council searched for ways to look at manufacturing processes from beginning to end or, as many people put it, from cradle to cradle (from cradle to grave and back to cradle again). The corporate leaders on the Council were increasingly excited about addressing that issue as an inherent part of their value system and their recognition of what they will need to provide to society in the 21st century: services and products that meet broad societal needs. This is one of the recommendations that the council expects to begin to implement in the next several months.

Another of the Council's recommendations concerns market-based incentives. This recommendation reflects the premise that we ought to put our incentives where our objectives are. We ought to make it profitable to be green. We ought to adjust our system so that there is a constant financial pressure for better performance so that zero release becomes a goal toward which we are always progressing even if it is never reached.

When dealing with market incentives, of course, it's useful to look at the tax system. This year the U.S. Treasury will collect something like $1.4 trillion dollars in federal taxes. About $1.2 trillion will be taxes on labor and investment, on wages and profits. We tax cigarettes because we want to discourage smoking. And we collect $1.2 trillion in taxes on labor and investment because so it seems we don't want

people to work and invest. It occurred to members of the Council that by moving that tax burden around a little bit, you could put your incentives where your objectives are pretty effectively. After all, $1.2 trillion gets people's attention. The Council discussed the idea of a revenue-neutral shift in tax burden to things we would like to discourage, such as waste.

Still another recommendation concerns ecosystem integrity, which is what this conference is about. The Council came to see that it is critically important to recognize the link between ecosystems and communities. The most effective examples of ecosystem management that we saw were examples of communities choosing to get engaged in the management process, along with all of the stakeholder groups. These were examples of community involvement in addressing the whole set of needs that fit within the questions how and why are we going to manage and protect an ecosystem? Many of us came to the Council with long-term experience with and commitment to national policy and came away from the process with deep respect for what can happen at the community level.

We also came away with a recognition that the process and the result are not separate that it is the collaborative process that makes results possible.

In making policy recommendations, we are essentially experimenting with policy. We don't really know how ecosystems work. We don't really know what the results of policy will be. That's no reason to stop in place. We want change. The nation recognizes that things can't go on the way they are. We would be much freer to address the need for change if we could be confident that if an experiment didn't achieve the goals that we had set forth, we could move on and try something else. Of course, that's extremely difficult in a confrontational setting, in which the parties withhold information from one another and are full of mistrust. It turns out to be easy in a cooperative setting. So the cooperative process and the ability to experiment and try new ideas go together.

Our report is a fundamentally optimistic document. We all concluded that we have not begun to exhaust the one type of resource which compounds so that the more we use it, the more we have of it. That is knowledge and intelligence.

We ended up a group of profound optimists, convinced that it is perfectly possible to achieve the mission of sustainability. That may be why, when we handed in our report to the President, expecting it to meet our requirement, he said, "That's good. Keep going." He asked us to continue working through the end of the year, beginning an implementation process. That is now underway, and we have gained some new members representing, in particular, state and local interests, and small businesses. We've launched efforts with state and local governments. We're launching a stewardship initiative and a regional council initiative. And we're beginning to take up ideas for specific, on-the-ground things that we might be able to do.

So please, those of you who have stories to tell, tell us what's useful to do. The Council will not be meaningful because we published this nice report the first printing of which sold out in three days. It will be meaningful if it has something to do with what actually happens in the world.

Let me take this opportunity to say that we are up on the World Wide Web at ***http://www.whitehouse.gov/pcsd***. In the six months that we have left, we particularly want to connect with state and local programs. We'd like to be deluged with suggestions concerning sustainable development and stories of initiatives that are working successfully.

Note: A joint presentation by both co-chairs of the President's Council, Jonathan Lash and David T. Buzzelli, was planned for the Watershed '96 conference. However, Mr. Buzzelli's plane was grounded in Minnesota due to dense fog, and Mr. Lash covered material that would have been presented by his fellow co-chair.

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Establishing a Common Goal: Sustainability
Monday, June 10, 1996

Welcoming Remarks

The Honorable Kurt L. Schmoke

Mayor of Baltimore, Maryland

Good morning. It is a great pleasure to welcome you to Baltimore city. We are honored to have been chosen to host this important environmental gathering.

I hope you have time to see some of our city. Baltimore has much to offer, from old historic neighborhoods to this bustling downtown; from museums telling the story of the city's past to state-of-the-art laboratories exploring the sciences of the future. We're home to the Baltimore Orioles and their beautiful Camden Yards stadium, and now the Ravens NFL team, as well as world-renowned art.

First, I'd like to thank the U.S. EPA, the Water Environment Federation, and the many other federal, state, and local agencies and environmental groups who have planned this event. A special appreciation to Robert Perciasepe, one the conference's co-hosts, who was such a good friend to Baltimore while at the city's planning department, who then moved on to help lead the Maryland Department of Environment, and is now a top official at EPA. I'd also like to commend our Governor, Parris Glendening, who has provided strong leadership in balancing environmental concerns with growth and development issues in Maryland. These are the kinds of talented and committed partners we have at the state and federal levels to help us improve the quality of our environment and thus the quality of our lives here in Baltimore and throughout Maryland.

I have just returned from attending the United Nations' Habitat II conference on human settlements in Istanbul, Turkey, where we focused on broad strategies of how to create sustainable urban communities around the world. I'm now more convinced than ever of the importance of gatherings like this which bring professionals and activists in the private, public, and non-profit worlds together to share ideas,

mobilize public support, and solve common problems.

I believe strongly that we must reclaim our cities and communities block by block, and neighborhood by neighborhood, and that citizens must be empowered to revitalize their own communities. But it's also essential for regional leaders and national experts like yourselves to share information and strategies on the pressing problems of our day, and to keep us all focused on long-term planning and solutions.

Like the international conference on cities that I just attended, this watershed conference deals with environmental and developmental issues that will have major consequences in our lives and our communities into the next century. We can plan now to preserve and protect the nation's most precious natural resources, as well as the quality of life that they sustain. Or we can abdicate our responsibilities to the planet, and reap untold disaster and misery down the road. I think it's pretty clear which mission this Watershed 96 conference and all of you have chosen to undertake.

I'd like to talk briefly about some of the ways that Baltimore city has promoted progress in this area. Baltimore and Maryland, for example, depend heavily on the Chesapeake Bay as a source of both income and recreation (and, I might add, an inspirational source of natural beauty). With thousands of Maryland families depending on the Chesapeake for their livelihood, we know we must protect our wetlands and the wildlife that they nurture. And it's imperative that we also encourage the development of industries that don't pollute our environment.

These are the kinds of challenges in which cooperation and collaboration are essential for success. Streams, lakes, and coastal areas know no formal boundaries. So we need to work together regionally, across city, county, and state lines, if we are to effectively protect the air we breathe and the water we drink.

One of those regional efforts in which the city is taking an active role is the multi-state effort to protect the Chesapeake Bay. As a signatory to a pact to be a key partner in this effort, the city has contributed to the Chesapeake Bay tributory strategies in a number of ways. Our efforts include reducing toxic waste in the Baltimore Harbor, enhancing storm drain management, and improving our waste treatment plants. We continue to work toward reducing the pollutants in our streams and rivers that flow into the Chesapeake.

A related regional effort, which we celebrated just a few weeks ago, is a federal, state, and local effort that will study how to improve the Gwynns Falls watershed, which runs through Baltimore county and Baltimore city, and empties into the Patapsco River's middle branch. The city is sharing the cost of the study with the U.S. Army Corps of Engineers. This effort could eventually restore 150 acres of land, many miles of streams, and up to 25 acres of wetlands.

Many of you will make a site visit to one of our urban projects that involves reclaiming some of the city's abandoned open spaces. Baltimore's Druid Hill Park and Herring Run Park are among our urban resources initiatives (URI's), aimed at helping neighborhoods take back the city's open areas. These

efforts include community forestry, park planning and management, job training, and environmental education for our inner-city youth. Also included is a natural resource management training course for the employees of Baltimore's Department of Recreation and Parks.

The city is also developing the Gwynns Falls greenway, which would establish a walking and biking trail system across the city, linking neighborhoods together by following the stream. Community support is growing for this "greening" of Baltimore.

To me, one of the most important aspects of these urban projects is to gain the interest and commitment of the young people in our cities to get involved in protecting our natural resources. It's particularly important, I believe, for the younger generation to see the connections between cleaning up the storm drains or streams in their communities, or planting a tree, and a cleaner, healthier, safer environment for everyone in the future.

By the year 2025, almost 5 billion people, or 62 percent of the global population, will live in urban areas. If this planet is to survive, there is an urgent need to educate urban residents about conserving and protecting the world around them, and mobilize them to be active partners in cleaning up the environment.

We are fortunate here in Baltimore to have world-renowned educational institutions like Baltimore's National Aquarium and the Maryland Science Center, which have been magnets for young people and families to explore the wonders and excitement of nature, and which also underscore the theme of conservation and environmental protection.

A final example of Baltimore city's commitment to the environment stands a few blocks from here on the Inner Harbor the Christopher Columbus Center which I hope you will visit. Created through a public/private partnership, it will be the nation's leading research facility studying marine biotechnology. That is, learning how to use aquatic life to develop new drugs, foods, and materials. It will also offer educational opportunities for scientists and inner-city children alike to further explore their underwater universe. The center will make a strong case that investing in the environment is good both for business and for maintaining a higher quality of life.

I wish all of you a highly successful and productive conference. Your work here in Baltimore will be critical to this region's and this nation's ability to protect and preserve our most precious resources. To quote from Psalm 24: "The Earth is the Lord's." That is true. And we must protect the only Earth the Lord has given us.

Thank you.

Establishing a Common Goal: Sustainability
Monday, June 10, 1996

Welcoming Remarks

The Honorable Parris N. Glendening
Governor of Maryland

Good morning! Let me welcome you to Maryland, to Baltimore, and to this outstanding conference. I hope your time here will be productive and exciting, and a learning experience.

Being Governor of Maryland brings a lot of hard decisions and a lot of criticism. But it also comes with some very special privileges. One of the privileges is being able to work with people to protect the state's greatest treasure, and that is our natural resources and, in particular, the Chesapeake Bay.

The Chesapeake Bay, as everyone here knows, is the nation's largest estuary. In many ways, it is the heart and soul of Maryland. The bay and its tributaries, the major rivers, are an extraordinarily important part of our public policy decisions from almost every perspective. For many Marylanders, the Potomac, the Patuxent, and the Susquehanna are part of our heart and soul not just on a public policy level, but on a personal level as well. For example, on the weekend before last, my son Raymond, who is now 16, and I went out rock fishing on the bay. That experience is something that means a great deal in our family. We want to make absolutely sure that the opportunity is there for my son's children and his children's children. The only way Marylanders are going to achieve that is by working together. I know the same situation is true in state after state.

In Maryland, we have come to understand that you cannot have a strong economy without a thriving environmental effort. The two economy and the environment go hand in hand, and we can do both well. I think that is a given. And I would go one step further and say that a really good environmental test area such as the Chesapeake Bay is in fact in part what a good economy is about as well. Today, we're here to look at different visions of the future initiatives that protect our natural resources and promote a sustained economy. In many ways, Maryland can serve as a microcosm of the challenges we all face in America and also as an example of how best to overcome those challenges. We've been doing some exciting

things here that people come from elsewhere to see.

Let me just put things in perspective very quickly. Maryland's population is expected to grow by 20 percent during the next 25 years: from 5 million to 6 million people. If the growth patterns that have been in place over the past 25 years do not change, consider what will happen during these next 25 years:

- We will virtually abandon our great and historic urban centers, such as Baltimore city.
- We will consume more than one-half million acres of farmland.
- We will consume nearly one-quarter million acres of forests, which are absolutely critically important to the water quality of our rivers and bays.
- And we may well see the future that Judge Otto Kerner warned America about 25 years ago. Regarding race in America, he talked about the potential for two separate societies, a prospect we might very well face if we do not do something about the direction of growth: one wealthy and prospering in growing suburbs and outer suburbs, and one poor and declining; one with jobs and hopes for families, and the other increasingly jobless; one having huge new homes on large estates, and the other having large collections of homeless.

None of us wants that scenario. From the perspective of what our society will look like and from the perspective of what our environment will be, we must make commitments to change. Fortunately, we in Maryland have recognized that we must change the way we grow and we must work harder to safeguard our environment. Our approach is not based on a series of governmental orders or top-down mandates, but rather in large part on the recognition that citizens must be involved in what must be done.

Let me mention some of the reasons why we are taking that approach. Consider that virtually every Maryland citizen and business lies within one-quarter mile a 5-minute walk of a stream, or creek, or river, which flows directly into the Chesapeake Bay. Every Maryland citizen and business impacts the bay. Every Maryland citizen and business has a direct interest in protecting the bay, not only for aesthetic or environmental reasons, but also for the well-being of our economy.

Consider that recreational boating in Maryland employs over 18,000 people and is worth $1 billion a year, that recreational fishing adds another $1 billion a year to our economy, that the crab harvest alone in Maryland is almost $100 million annually, and that tourism adds billions to our economy. When you consider these facts, it is clear that protecting and preserving our natural resources is in fact vital for our economic success.

But we must recognize as well that this is not just about the economy. We must protect the environment for its own sake. We are all of us stewards of this land, and we have a serious responsibility for the air our children breathe, for the water they drink, for the quality of life that they will enjoy in the future. Part of our approach therefore is to involve people, and that's why we appointed the state's 10 tributary teams 312 Maryland citizens who volunteered to help implement the state's tributary strategies of reducing nutrients in the bay; coordinating and encouraging the participation of citizens, businesses, and the agricultural community; and promoting a sense of stewardship among our citizens. Our tributary teams

are the local stakeholders, people who will inspire and educate their fellow citizens about what we must do to preserve our great resources. The members of these teams share with me the understanding that success can only come with a cooperative effort between government, business, and people.

Our tributary teams are unique in the nation in that we were the first state to adopt the large-scale, state-wide, watershed-wide approach to coordinating nutrient reduction efforts. It is a bottom-up, community-up effort, and we are having an impact. One quick example of the success we are having in fostering a sense of partnership: Farmers in Maryland have voluntarily put over 700,000 acres of their land under nutrient management programs. To put this in perspective, Maryland has more land under nutrient management than any other state in the country. That is a record of which Maryland farmers can be proud, and it is an outstanding example of how, if you involve people from the community level up, you can indeed have great success.

We are rethinking, right now, how to deal with the most fundamental issue of water quality protection, and that is land use and land-use management. We all know the advantages of pursuing a forward-thinking strategy of growth management for revitalizing existing communities. This is true whether you are talking about big communities such as Baltimore city or small communities such as Cumberland, Maryland. The key issues here include preserving our open space and having viable centers where economic growth can take place.

If we can pursue more aggressively a strategy of well-managed growth, there are obvious environmental benefits, such as protecting farmland, preserving forests, and conserving wetlands. There are also obvious economic advantages when you think of the hundreds of millions of dollars that we spend on new roads, new sidewalks, new water and sewer lines, and new schools to accommodate growth always moving outward. There is also something less obvious, but I hope we will all be paying more attention to it, and that is the need to foster a spirit of community, to bring back a sense of community. One of the things that is very clear all across this country is that as suburbs sprawl out, there is less and less sense of community. The suburbs are a place where we go to sleep and to house our family and to reside for a while. But without neighbors who know neighbors, without a sense of heritage a sense that "we belong here" we have lost something important.

We also know that planning is not enough; tributary teams are not enough; community involvement is not enough. If we are going to be successful, we must use the resources of government to create a series of major incentives and disincentives to direct growth back to existing urbanized areas. In Maryland, we are making the necessary changes to move in that direction. For example, Maryland participates in a significant way in the school construction formula. In this administration, we have made a major change so that the first priority for school construction is for modernizing and expanding existing schools in existing communities. We want the best schools to be in our existing urbanized areas and not, as has been the practice in the past, for the newest and best schools to be built to accommodate growth which moves outward. In the past, only 40 percent of school construction funding went to renovate and modernize older schools in our older communities; now 80 percent will go to our older schools.

We have created a major Neighborhood Business Development Program to bring jobs into existing communities. We have just adopted, as part of our economic development program, a jobs-creation tax credit. You get twice the tax credit, however, if those jobs are brought to targeted neighborhood revitalization areas. And we just changed our Department of Transportation budget, so that for the first time the state Department of Transportation works with smaller communities, when state roads run through those communities, on matters such as sidewalks, curbs, and gutters, so that these communities will be active partners in revitalization efforts.

All of this, we believe, will still not be enough. We will be working with legislative leaders next year on a whole series of additional incentives and disincentives to make the economy so strong that private investors will find better investment deals to build, to bring jobs, to renovate houses, whatever the endeavor in already existing communities than is available by buying farmland and developing it. I believe we can do this using means ranging from Brownfields to tax credits to a variety of additional incentives. We are very excited about the input we are getting from the public on these incentives and the positive changes we see coming.

Let me note, lastly, that while you are here in Maryland I hope you will take some of the tours that have been arranged for you, and that you will consider some of the experiments that are going on here. For example, you might take a look at the impact of sand and gravel mining on the stream enhancement project at White Marsh. You might drop in on the Chesapeake Farms Sustainable Agricultural Project on Maryland's historic Eastern Shore. You will have a chance to see social revitalization through ecological restoration at the Druid Hill/Herring Run Park tour. You can inspect the stormwater management work going on in Wheaton Branch; you can see first-hand how levels of government can make a difference with the world-class Kenilworth marsh restoration.

These are exciting projects, and they are on the cutting edge. We are experimenting; we know there is no one answer. We invite you to share in the process and also to share ideas with us on ways to make it better. That is truly what this conference is all about sharing with one other and that is why we have our entire team here today. It is about sharing so that we can all prosper, so that we can all have the environment we want, and so that our children and our grandchildren will be able to know the health and environmental benefits that we have had. We owe it to them to pass on an environment that is as good as or better than what we inherited. I believe this conference will contribute to that outcome.

Thank you very much.

Getting Down to Business Frameworks for Action
Tuesday, June 11, 1996

Keynote Address

Ralph Grossi
President, American Farmland Trust and Member, National Forum on Nonpoint-Source Pollution

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The conference brochure described this gathering as "an interactive forum on the progress and future of watershed management." A recent conference on wetlands management, another on controlling urban sprawl, yet others on managing ecosystems, public lands, and old growth forests, property rights, and the appropriate role of government agencies in land management are a regular occurrence in our world today. What do they all have in common? They are all about how we allocate and care for our natural resources. This increasing interest in land use is a symptom of a society in conflict over the allocation of finite resources.

In a very ad hoc manner we are engaged in a national discussion about the use of land. Very fundamental tenets of our culture are on the table questions about how we determine our priorities as a society; and about how those priorities square with the rights and responsibilities of individual land owners and those of the larger community. The situation could easily be characterized as the competition for land a competition that is increasing at an exponential rate, fueled by three inter-related factors:

- An overall increase in population: While U.S. population is not increasing at the rate of developing countries, it is still expected to nearly double in our lifetime 500 million people by the middle of the next century.
- The redistribution of that population: The post World War II period can be characterized as the "suburbanization of America." As our citizenry has escaped to the suburbs and now the exurbs, the use of land has become less efficient resulting in fewer persons per square mile and the conversion of millions of acres of this nation's best farmland to housing tracts. Consider, for

example, some basic statistics from a study done by the Northern Illinois Planning Council, which presents a 20-year snapshot from 1970 to 1990 of the Chicago Metropolitan area. During those two decades the metropolitan area population grew by just four percent. During that same period, however, land use for residential purposes grew by 46 percent. And virtually all of that land was in a watershed!

- The changing values of that population: As America has become more suburban, its values have changed as well. The use of land for traditional economic pursuits seems less important to many than the more difficult to quantify amenities associated with land. I am speaking of things like open space, wildlife habitat, wetlands and, of course, watersheds. For example, the Grossi family farm happens to be in Marin County, 30 miles north of San Francisco on the urban edge . From our dairy barn, I can see homes that sell for $1.5 million on quarter-acre lots. Conversely, suburbanites sipping Chardonnay on their decks can look up the valley into the watershed. What they see and perceive is not the production of milk and beef but open space, not my farm or my neighbor's or my uncle's farm, but their open space. They expect that open area to provide amenities like wildlife habitat, wetlands, and high quality water, all things that are increasing in value in public perception.

These changing expectations of our society are further complicated by the fact that most of this competition for the use or allocation of land is played out on privately owned land the largest portion of which is agricultural. The benefits of protecting these values often accrue not to the landowner but disproportionately to the community at large. It is no wonder then that this competition erupts into outright conflict.

Sociologists describe this kind of change as a paradigm shift. The land use paradigm is shifting, but the frameworks by which we adjust to those shifts are not evolving fast enough to keep up. Traditionally, broad societal natural resource goals have been achieved by increasing regulation or using public funds to protect land outright by acquiring it for parks, open space, and other public uses. The limitations on these techniques are increasingly evident fiscal austerity is already limiting the ability of government agencies at all levels to acquire land. And the property rights movement in all its manifestations is further limiting the political will to use regulatory powers.

Additionally, our political system often increases the conflict by providing incentives to favor one behavior over another, then failing to adjust those incentives over time as societal values change leaving those affected with very abrupt adjustments to make (example: draining wet farmland to promote food production).

For watershed management, the inconsistency in government policies is particularly problematic. A wide range of federal and state subsidies, from infrastructure improvements and tax free financing to the mortgage interest deduction, promote urban sprawl making public and private conservation efforts far more expensive than they otherwise would be. Or, in the case of farm programs, payments that get capitalized into land values effectively cause the taxpayer to pay twice once to inflate the land value and a second time to provide incentives for conservation.

But even when we can come to agreement over resource allocation priorities, we continue to struggle over how to share the cost especially when those who benefit include the larger community and unborn future generations. The greatest liability we leave our grandchildren is not the national debt but the state of the land sprawling subdivisions that will have to be supported with future tax dollars, shifting food production onto marginal lands and the loss of biological diversity.

To correct for this developing tragedy we awkwardly apply the traditional tools of regulation and acquisition. But when regulation is used it tends to shift the cost to the land owner. Compensation transfers the cost to the taxpayer.

Clearly, both have responsibility and generally are willing to shoulder a fair share. What is the proper balance?
What is fair for both the individual landowner and the broader community?

The new paradigm of land use needs a new framework for action. Buried in the contentious debate over land use and property rights are some evolving answers. As in the early stages of any major conflict, the solutions are not yet well refined. Many of you are involved in these new experiments which are rooted in an understanding of four simple principles:

- The future of land conservation in this country will largely focus on private lands.
- The ability of government to intervene will be limited.
- Mechanisms for sharing the cost of stewardship of our natural resources between the private land owner and the public at large must be developed.
- Private landowners have an inherent interest in land stewardship.

The National Nonpoint Source Forum report identified these themes and the conservation provisions of the recently signed farm bill (the Federal Agricultural Improvement and Reform Act of 1996) included them. Assuming Congress follows through with its commitments, as commodity programs are phased out over the next six years, a comprehensive, well-balanced set of conservation programs built on the principle of shared responsibility will be phased in. They include:

- Farmland Protection Program The 1996 Farm Bill establishes a farmland protection program, $35 million in funding from the Commodity Credit Corporation. The program authorizes the agriculture secretary to purchase conservation easements to protect farmland by matching state funding. Although a modest program, it represents the first significant step in providing federal assistance to local communities for farmland protection.
- National Natural Resources Conservation Foundation The farm bill authorizes the establishment of a nonprofit private foundation to sponsor and advance innovative solutions for conservation and environmental problems through effective partnerships with state, local, and private organizations.
- Conservation Reserve Program The CRP pays farmers to take highly erodible land out of production. The 1996 Farm Bill reauthorizes CRP with a cap of 36.4 million acres. New

enrollments, emphasizing broader environmental benefits, will be accepted in the program as long as they do not exceed the established cap. This provision should allow CRP to become a more effective conservation program by enrolling the most environmentally sensitive land wherever it is located and by encouraging some of the highly productive land now in CRP back into production.

- Wetlands Reserve Program The WRP pays farmers to restore wetland areas on farm acreage. It is reauthorized through 2002 with a cap of 975,000 acres. The program is divided into three parts with one third of the land enrolled in permanent easements, one third in 30-year or less easements, and one third in cost share agreements.
- Environmental Quality Incentives Program The 1996 Farm Bill creates an Environmental Quality Incentives Program (EQIP) to provide financial, technical, and educational assistance to producers struggling with the most serious soil, water, and other resource-related problems. The program will be funded at $200 million annually through 2002 except for 1996, when $130 million is authorized. The program is structured so that half of available funds will be targeted to correct problems associated with livestock operations. The program is designed to tackle issues such as nonpoint source pollution, including fertilizer, manure, and soil runoffs into watersheds and waterways. EQIP will help farmers adopt and install conservation practices through a cost-sharing mechanism that will specifically target environmentally sensitive lands.
- State Technical Committees The 1996 Farm Bill authorizes the broadening of state technical committees to include representatives from nonprofit groups, agricultural producers, and agribusiness. The role of the state technical committees has been further expanded to oversee EQIP administration.
- Wildlife Habitat Incentives Program The 1996 Farm Bill reserves $50 million of Conservation Reserve Program funding for a Wildlife Habitat Incentives Program. This program is designed to help farmers adopt wildlife habitat protection techniques and management practices to help preserve and improve wildlife habitat on farmland.
- Floodplain Easements Related to the WRP, the 1996 Farm Bill authorizes floodplain easements to be purchased under the Emergency Watershed Protection Program.

These programs are not the final answer to the natural resource challenges facing us, but they represent a very good beginning and an opportunity to test our ability as a nation to come to deal with the task. They represent an important step in the evolution of the next generation of public policies that meet the needs of both landowners and taxpayers. Ten years from now farm programs could very well reflect a new contract with the American public a contract whereby public support for farmers is based not on the crops they produce but on the environmental products produced on the farm. Each of you should be working on the local and regional policy counterparts to these programs to position your community to make the most efficient use of precious public support.

It is well past time for the hyperbole and extremist rhetoric to give way to reasoned discussion over the legacy we leave our children. As a landowner, I am ready to begin the discussion and I know that many of my fellow farmers are as well. As a taxpayer, I want to end the needless subsidy of land abuse and to improve efficiency of conservation programs. We have the ability and the institutional processes to turn the competition for land into a consensus for stewardship.

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Getting Down to Business: Frameworks for Action
Tuesday, June 11, 1996

Opening Remarks

Larry Selzer

Vice President, The Conservation Fund and
Director, National Forum on Nonpoint-Source Pollution

Yogi Berra, who is one of my favorite philosophers, once said, "The future ain't what it used to be." I think that this single sentence aptly wraps up much of our thinking about the environmental movement today. We're witnessing a fundamental shift in the environmental movement a shift marked by decentralization at all levels, a shift from government to the private sector, a change in perspective of the American voter, and the emergence of new technologies at rapid-fire pace. If we look back over the last 25 years of the environmental movement, back to the first Earth Day, we see some remarkable changes. The first Earth Day was ushered in by Rachel Carson's Silent Spring, and it represented the first tidal wave of the environmental movement in this country. It was a tidal wave born out of the linkage, for the first time, of environmental quality with human health.

We've had a lot of successes since then. We have cleaner air. We have cleaner water. Industry uses less raw materials and is more cognizant of the waste it produces. Citizens are more environmentally conscious. There are 50,000 pieces of environmental legislation on the federal, state, and local books. There are 10,000 environmental nonprofit organizations in this country, one new one formed each day. Nearly 80 percent of American people now identify themselves as environmentalists.

These are remarkable successes. But this fundamental shift has brought some key questions to light. In the first place, Americans now want a much broader dialogue on the relationship between economics and environment. They are questioning centralization at all levels and in some cases demanding local control. And, as Jonathan Lash told us all yesterday, they are beginning to speak with a new language:

the language of sustainability.

With these things in mind, I see two great challenges before us. First, how can we build the capacity of local organizations and local people to effectively deal with the complex environmental issues we all face? Second, how can we merge environmentalism with the free-enterprise system to achieve our goals?

For the past 25 years, we've seen two powerful forces in America. Like two streams flowing across the land, the free-enterprise system and the environmental movement have followed different courses. It is now time to blend them together into one mighty river of action. This is more difficult than saying it up here at the podium. To accomplish this, we must develop new skills; we must develop new tools; and we must learn a new language. I suggest that watersheds are the place to start. Our rivers and streams define them clearly by geography. Perhaps they will be the common ground on which we build this new framework for conservation.

What will the new framework look like? Let me give you five ideas as a start. First, this framework will be based on collaboration, not confrontation. Second, it will fully integrate economic reality into environmental protection. Third, I believe it will be led by the private sector and the nonprofit community, not by government. Fourth, it will be technology-driven. And lastly, I believe it will be community-based.

How will we get there? This gathering over the next several days is a start. We are all here at Watershed 96 to discover to discover new ideas and new people, to develop new relationships. I believe this discovery process is the key.

In 1994, the Conservation Fund and the National Georgraphic Society began their own process of discovery, which led to the National Forum on Nonpoint-Source Pollution. The Forum was an unprecedented collaboration of industy, government, and nonprofits. It was chaired by Governor Engler of Michigan and Governor Dean of Vermont. Serving with them were seven corporate CEOs,five environmental CEOs, the Mayor of Baltimore, the Secretary of Resources for the state of California, and three Cabinet members of the federal government as ex officio. The goal of the forum was to identify and implement innovative nonregulatory solutions to nonpoint-source pollution based on three primary strategies: economic incentives, voluntary initiatives, and education. We specifically carved out the nonregulatory side of the ledger in order to complement the regulatory framework and to bring people to the table. I believe we had enormous success.

Out of the forum emerged 25 key demonstration projects now operating across the land that represent a menu of activities and organizations and communities, some of which we'll hear about during the panel. We raised nearly $12 million in public and private capital to back these projects and get them going. In addition to the 25 projects, we've launched four major new initiatives. First, in partnership with the Council of Great Lakes governors, and with the leadership of Governor Engler and his peers, we have launched a major new watershed initiative in the Great Lakes Basin, focusing on urban and urbanizing areas, those lands in transition as development approaches. Second, in partnership with EPA and the

U.S. Geological Survey, we have developed a watershed address system on the Internet. Soon, anyone with access to the World Wide Web will be able to type in their zip code and pull down a nested series of graphics representing the watersheds in which they live. This will be a very powerful tool for educating all Americans. Third, in partnership with EPA and the state of Pennsylvania, a state-wide nonpoint source forum focusing on watersheds will be launched in Pennsylvania. I believe this is the first state-wide forum in the country and represents true leadership at the state level. And lastly, in partnership with CF Industries, one of the members of the Nonpoint-Source Forum, we have launched the nation's first national watershed awards. These awards will recognize corporate and community excellence in watershed protection.

What we're really talking about is conservation leadership. What is it, how do we foster it, how do we encourage it ? Conservation leadership today is no longer a matter of merely alerting the populace of the problems that we create through insensitive management of resources. It's now about good science, careful formulation of policy, realignment of economics and ethics. National polls tell us repeatedly that people are ready for leadership in conservation, and that conservationists are found in all sectors of society. I think you'll agree after hearing today's speakers.

Getting Down to Business: Frameworks for Action
Tuesday, June 11, 1996

Response to Watershed Challenges Panel Discussion

Trudy Coxe

Secretary, Massachusetts Department of Environmental Affair

My job is to speak with a state official's hat on, and the one thing I've learned as the Secretary of Environmental Affairs for the state of Massachusetts is that there are two ingredients to success when it comes to credible state action on the watershed front:

- *First, there has to be a belief in the power of partnerships particularly with watershed associations, businesses, and local officials.*
- *Second, there has to be a belief in the view that government's job is to serve the watershed.*

I want to welcome all of you to the wonderful world of the Neponset watershed. Highway signs more than two dozen of them were put up by the Massachusetts Department of Transportation on all of the key roadways leading into the Neponset. The message is simple: "Entering Neponset River Watershed: Communities Connected By Water." And this simple message has done more to reinforce, publicize, and make people ponder what a watershed is than almost any other.

Immediately south of Boston, the Neponset is most definitely an urban watershed, made up of 14 towns and cities. The Neponset is one of 27 basins in the Commonwealth, and, despite its urban character, it is still a very pretty area providing rich habitat to an assortment of fish, birds, and yes, people.

Several years ago, Governor Weld announced the start of a special project focussed on the Neponset. The goal was to identify with the assistance of all of the environmental agencies in the state and with the

advice and counsel of local officials, watershed organizations and businesses what the "real" environmental obstacles to cleaning up the watershed were.

Hundreds of meetings helped produce a HOT SPOT map red blocks signify where serious pollution problems exist; yellow blocks are areas in danger.

Stream Teams were trained to do shoreline surveys. And people were mobilized to go out on foot and by canoe to gather first-hand information about the river.

A group calling themselves Smelt Stewards involving 200 volunteers a month began to read stream gauges and do water-quality monitoring, and teachers and students were enlisted to focus their science studies on the Neponset making science in their classrooms real because it involved real issues.

There was an outpouring of help.

The increased level of understanding of the river laid the groundwork for a tremendous amount of action in a very short period of time.

Let me give you six successes:

***Success Story #1:** A 15-year simmering debate over the cleanup of a hazardous waste site resulted in a legal agreement for the site to be cleaned up. The owners of this site are so enthusiastic about the watershed project that they have set aside for protection Willet Pond, which they donated to the Neponset River Watershed Association (NRWA).*

***Success Story #2:** Norwood, Massachusetts, officials voluntarily agreed to fix an illegal sewage connection to a stormline. Before their action, fecal coliform levels were in the 150,000-240,000 colonies/ml range. After the repair, the levels are down to 40,000. And there's continuing repair work occurring to get that number even lower.*

***Success Story #3:** The owners of the most popular racetrack in the state located at the head of the Neponset have embarked upon an aggressive effort to control horse manure runoff into the river.*

***Success Story #4:** And shad from the Connecticut River have been transplanted to the Neponset with a commitment from the state to put a fishway at Baker's Dam to restore anadromous fish runs.*

***Success Story #5:** At Mill Brook, a stormwater management plan has been developed to collect and treat stormwater overflows.*

*And, finally, **Success Story #6:** The lower portion of the Neponset has been designated an area of critical environmental concern (ACEC). It is the first urban ACEC in the state's history, and its designation as an ACEC means that it will receive a higher level of scrutiny when development decisions are being made.*

We've learned a lot from our Neponset experiment.

We've learned that people know a lot about their neighborhoods, and if called upon can be great assets to providing an even better knowledge of the water we're trying to protect.

Based on the progress made in the Neponset, we have in consultation with a large number of watershed associations, business leaders, and regular people decided to take the Neponset statewide.

This decision has required all who are involved in the watershed approach to change their thinking.

Two challenges stand out most prominently:

***Obstacle 1:** How to structure the expertise embodied in state government in such a way that every penny of taxpayers' dollars goes towards improved water quality, better land management, and better neighborhoods.*

There are five departments in my Secretariat. I have to confess that they don't always work together as well as they could So, by executive fiat, we've established cross-agency basin teams for each one of the 27 basins. Each team is made up of one person from the five departments.

Remember, our motto is that government's job is to serve the watershed.

The teams are developing with help from locals action plans; they're meeting regularly; and, I hope, they're finding that their colleagues in other agencies aren't so bad, after all.

***Obstacle 2:** If government chooses to empower local watershed associations to a greater degree, are these associations prepared to pitch in with a lot of energy?*

Massachusetts is blessed with a tradition of strong environmental protection. There are more than 100 well-established watershed groups, most of them run by volunteers.

To jumpstart the ability of these groups to do the education, outreach, and problem solving that they're so good at, we convinced the legislature to include $2.5 million in a recently passed $400M Open Space Bond Bill. The $2.5M is specifically for grants to non-profits for capacity building and technical assistance. The first round of grants will be awarded this fall.

My five minutes of fame are up. There's much more to share. But I hope this gives you an idea of how our Neponset pilot has helped us define watershed management for the entire state of Massachusetts.

Charlene Poste
Environmental Policy Representative,

Squaxin Island Tribe and Member,
Northwest Indian Fisheries Commission

The Native American Tribes in Washington state have created a watershed protection strategy called the Coordinated Tribal Water Quality Program. Through this program, we are working with state and local governments and building partnerships for protecting our watersheds. These efforts reflect a holistic approach that has many roots in our Tribal history and culture.

In 1492, America was discovered or so they say. In 1642, a Narragansett Indian man named Miantunnomoh spoke of the degradation of watersheds and water quality. He said, "You know our fathers had plenty of deer and skins and our plains were full of game and turkeys, and our coves and rivers were full of fish. But brothers, since these Englishmen have seized our country, they have cut down the grass with scythes, and the trees with axes. Their cows and horses eat up the grass, and their hogs spoil our bed of clams ...."

In 1683, under a tree by the Delaware River, William Penn signed his famous peace treaty with the Indians. Significantly, in this peace treaty, it was stipulated that for every five acres that are logged, one acre would remain forested. This kept peace between Indians and white men for 50 years.

As time went by, the Indians were continually forced inland. For example, if you look at a sequence of U.S. maps at 30- or 40-year intervals between 1790 to 1890, you can see the drastic shrinkage of Tribal lands so that only widely scattered reservations remain by 1890.

In 1854, the United States entered into treaty negotiations to secure property for the westward immigration stampede that was then occurring. The result was the Medicine Creek Treaty of 1854; many other treaties followed in the northwest. Tribes including my Tribal ancestors in Washington state ceded vast amounts of land, but did reserve the right of Tribal existence and retained so far as possible a traditional way of life based on hunting and gathering.

The tribes of the Coordinated Tribal Water Quality Program are water people. Historically, salmon has been very vital to Tribal existence. For our ancestors, salmon was breakfast and probably lunch and dinner. Clams and oysters were also very important. We depended on the natural resources for everything we used in our daily living. We gathered grass from wetlands and used it in building portable mat houses and in making basketry. We stored fish, berries, and medicinal herbs in baskets. In addition to salmon, my people used water fowl as part of their subsistence diet; we also used the feathers of water fowl in our garments. Our tribes have an ancestral history of inter-tribal trade; we had inter-tribal trade routes spanning from Washington state into the Midwest.

Salmon are still very important to our people. We have salmon ceremonies honoring the coming of the salmon. When the salmon first show up in our streams and rivers, we have a ceremony to show our thankfulness. In Tribal legend, we have stories of salmon being part of us, the salmon being our brother. Tribal people view wildlife as though they are other nations of people.

In the Coordinated Tribal Water Quality Program, when we are getting down to business and frameworks for action to protect our watersheds, we try to instill a holistic view in the foundations of our work. The holistic approach is tied to traditional Tribal teachings concerning body, mind, and spirit.

Body:

We believe that we come from the Earth, that we are of the Earth, that everything we need comes from the Earth. If we should die, we turn into dust. In Tribal ceremonies, red ochre is traditionally used to signify that we are people that respect the Earth. Similarly, in the Judeo-Christian tradition, in the story of Adam and Eve, Adam translates to mean "red Earth." Of course, water is also of vital importance; it makes up 65 percent in our bodies. Some of us have an old Tribal custom of taking a drink of water, as an acknowledgment of life flow, before passing a particular stream.

Mind:

The Earth is our teacher. Our Tribal people believe that wildlife are important teachers too. From them we have learned what kind of plants to eat and what kind of plants were important for medicinal purposes. They have taught us their trails and about weather changes. They are still teaching us; they are teaching us about the importance of watershed protection. What happens to the wildlife will eventually happen to humans.

Spirit:

When I was a child, my mother would hold me, and I remember the rhythm of her breathing and the beating of her heart. The land is very much alive. To Tribal people, it is our Mother Earth. We see the rhythm of her life flow in the water, and in the salmon, birds, and deer. Everything in this land has a rhythm. We believe that we must always respect the sustaining life flow and rhythm of our natural resources. We believe in a strong ethic, of knowing what is right and wrong in our use of the abundant resources within our watersheds. We believe we need to consider how our choices will affect future generations. It is important to always keep in mind that how we use resources today will impact the generations of tomorrow. Many tribes believe in sacred circles connecting past, present, and future, each of which is seen as equally important: The future is connected to and no more or less important than the present or the past.

Through our Coordinated Tribal Water Quality Program, we are implementing strategies to protect the resources of our watersheds. We work in a government-to-government relationship with the State of Washington. The tribes also do legislative work to help protect watersheds and salmon resources. Important components of our coordinated efforts include public education and joint data gathering that is coordinated with the State Department of Ecology, Health, Fish, and Wildlife. Commitment is also very important to our work. Volunteers are a strong source of energy, and many of our volunteers have a keen sense of commitment to watershed protection.

In conclusion, when we work with other groups of people, it is very important to establish common ground. There is common ground in the protection of human health. Seen holistically, human health encompasses body, mind, and spirit. The knowledge that everything is connected past, present, and future can also provide common ground. Thank you.

Charles A. Hunsicker
Ecosystems Administrator,
Manatee County Planning Department
Bradenton, Florida

I would like to tell you a little about my county, Manatee County, Florida, and the watershed management tools we use there. I would also like to share, in this context, some observations of mine about the process of watershed management.

The population of Florida and Manatee County is strong and growing. That growth has placed a lot of pressure on our natural resources and our demand for water. Pressures and demands for clean water, wastewater treatment, landfill space: these are the kinds of pressures we are experiencing, the kind of pressures I am sure you have all experienced in differing degrees.

Our economy is based on tourism, agriculture, and light manufacturing (not the heavy stuff). Our geography is primarily flat. We have coastal plains and very low relief, and consequently we have short rivers. There are four major rivers in Manatee County, two of which support drinking water reservoirs. Our coastal zone falls within three of EPA's National Estuary Program areas: Tampa Bay, Sarasota Bay, and Charlotte Harbor.

There are probably 3 million people within an 80-mile radius of where I live. Our county is very diverse. The center point of our residential area is approximately eight miles upstream on the Manatee River. Our urban area is low-profile and low-density. A large percentage of our population does identify with water, having either a riverine or a coastal perspective.

Twenty-eight miles up the river we have a reservoir, a drinking water supply, for our county and the county to our south. Augmented by ground water, it provides about 45 million gallons per day for our population. Another 10 miles up the river (about 38 miles from our coastline) there is farming; we have a year-round growing season. Nearly all of it requires supplemental crop irrigation, despite nearly 50 inches of rainfall each year. We have lots of vegetable farming, cattle on the open range, and a lot of citrus oranges and grapefruit.

Interspersed in the interior of our county are large natural areas forests and wetlands, hardwood hammocks. These are the kinds of special areas that the State of Florida and our regional and local government are working hard to acquire for conservation purposes and low-impact recreation. The population crush in Florida has moved the state to adopt a multi-million dollar land-acquisition program called Preservation 2000. In the 1980s, our county residents voted to tax themselves approximately $38

million to acquire 23,000 acres in our drinking water watershed, to preserve the quality of our drinking water supply.

Our watershed management tools are tools that I am sure many of you are familiar with. The point I want to make is that effective watershed management ties these tools together in a thoroughly integrated way. It can be useful to visualize this integration in horizontal and vertical terms. It is important to achieve a horizontal integration of functions between and among land planners, regulators, restoration specialists, acquisition planners, and attorneys, among other people. It is also important for these tools and functions to be integrated vertically by common threads of science and information, a regulatory focus on ecosystems and watersheds not just individual activities and land planning activities. Vertical integration also means coordinated efforts among regional watershed management districts and local, state, and federal levels of government.

In my county, and in my part of the state, the Southwest Florida Water Management District is overseeing a new frontier in water use. Florida observes eastern water law, that water is for public beneficial use and is a public right. We are experiencing withdrawals that are overtaxing our aquifer's ability to replenish itself. Salt water intrusion is one result. So our state agency is wrestling with the concept of clamping down on new uses of water forcing the counties and local governments to seek out alternatives to those traditional sources of water. These might be reclaimed water use, stormwater diversions, even desalinization.

Let me close with three observations on how this kind of integrated approach can work in nearly all locations around the country. First, I believe that multi-dimensional problems are best solved with multi-disciplinary teams something that we've learned first hand in the Tampa Bay and Sarasota Bay national estuary programs. The national estuary teams are made up of talented program directors who are facilitators and communicators. They are backed up by program managers, who address the details of contracts and the endless agreements required in forming partnerships. Staff scientists direct the work of hundreds of experts. Educators and multi-media relations specialists play significant parts as well. This multi-disciplined team has made things work.

My second observation is really a request for help. To put the information from this conference to work back home, folks like myself need to work with different groups in our communities. This is going to require the assistance of social policy planners sociologists if you will to gauge the public opinion, to increase and measure community change, both positive and negative. Policy makers need to know how successful they are being and where adjustments need to be made to tailor a message to the public. Factors such as differences in socio-economic status, employment differences, age, and education any number of variables cause each of us to hear a given message just a little differently from some one else. I seek your help in the matter of communicating to our different audiences.

My third and last observation is really a challenge. As Charlene mentioned, a short-term mindset is sometimes counterproductive for dealing with certain problems and solutions that may reach across time time measured in generations. In our culture, we seem to insist on plans and programs with measurable results and closure in 5-, 10-, or 15-year increments. We know our representative form of government

often demands even shorter increments of time. And yet I believe we have to get comfortable with some solutions and goals which will not be achieved in our lifetime, and possibly not even in our children's lifetime, but achieved nonetheless with deliberate and measurable progress. The restoration of the Everglades and Florida Bay, the Chesapeake Bay, the Columbia River, to name a few, may require this kind of long, long-term view. Other countries and cultures including, in many respects, our Native Americans' hold just such a generational view of time and results. I believe we must adopt this view in some instances if we are to achieve lasting environmental protection and sustainability for our efforts. Thank you very much.

Suzanne C. Wilkins
Executive Director
Mississippi River Basin Alliance

Good Morning. Thank you for the invitation to speak at Watershed '96 on behalf of the more than 60 organizations that comprise the Mississippi River Basin Alliance. Founded in 1992, the Alliance links traditional conservation groups with environmental justice organizations interested in the well-being of the Mississippi River, its resources, and its people. We link citizens from the upper basin with those from the lower.

Alliance citizens view the river from very different perspectives, and we believe that this diverse viewpoint is critical in the watershed management process. We took three years to establish trust and to get our organization launched with the able guidance of the Maryland-based Institute for Conservation Leadership. Their role as facilitator was critical to bringing our diverse group together.

The Mississippi Watershed encompasses 1.2 million square miles all or part of 33 states and two Canadian provinces.

The Mississippi is blessed with a wide array of fish and wildlife species. It supports 5 million acres of forested wetlands, and 40 percent of the nation's migratory birds use it as a byway. The Mississippi provides the Gulf of Mexico with 90 percent of its fresh water.

As we have settled this continent, we have gravitated to our coasts and to our rivers. Eighteen million persons rely on the Mississippi for their water supply, and even more persons for waste assimilation.

In cities and elsewhere, many of our urban poor and indigenous people rely on the Mississippi River for a major source of their food. Unfortunately, fish in some of those areas contain unhealthy levels of contaminants.

While some areas are posted, advisories and permitting vary from state to state. Citizen organizations, such as the Mid-South Peace and Justice Center, have gotten Tennessee to ban commercial fishing on the Mississippi and are working for consistency across the river in Arkansas.

The lock and dam system on the Upper Mississippi is vital to the transportation of bulk commodities. Indeed some 380-400 million tons move down the river each year. Unfortunately, this system has resulted in a series of pools, which causes sediment accumulation and the filling in of backwater areas so critical to the survival of fish and wildlife. In 1993, top fish and wildlife scientists in the region developed a report indicating the potential collapse of the ecosystem on the upper river, which in part supports a $1.2 billion recreation resource. Currently, the U.S. Army Corps of Engineers has a $50 million study underway to expand the lock and dam system at an estimated cost of $5 to 6 billion much of which will come from taxpayers.

A variety of citizens, including the Alliance, are working with state and federal agencies in a consensus-building process called the Summit to improve understanding of the river's system and diverse uses and needs.

The levee system began when flood events caused damage to human settlements and agricultural investments. Taxpayers continue to pay for poor land use decisions every time it floods.

Despite our best efforts, we cannot control the mighty Mississippi. The Flood of 1993 caused $12 to $16 billion in damage. The recommendations of the Galloway report, undertaken after the '93 flood, have to date been by and large ignored. The Corps' own report, also undertaken after the '93 flood, called for a variety of structural and nonstructural methods to minimize flooding. This study, too, has been ignored.

While agricultural practices have improved with technology, we still have too much erosion, which results in phosphates and nitrates finding their way into receiving waters.

Indeed, nutrient over-enrichment has resulted in a 7,000 square mile "Dead Zone" in the Gulf of Mexico. This area the size of Connecticut and Rhode Island combined has impacted the commercial fishing in the area. The Gulf provides 20 percent of the nation's domestic commercial fisheries. Citizen organizations, such as the Alliance and the Gulf Restoration Network, have recently been working with EPA to address this problem.

Another result from agricultural runoff has been the introduction of triazines in our water. Last summer, the Alliance, in conjunction with the Environmental Working Group and others, brought public attention to spring- and summer-time atrazine and cyanazine spikes in our drinking water. Water quality standards are set for healthy adults, and we are just beginning to understand the impact on humans by endocrine disrupters, as described in the new book Our Stolen Future.

Citizens in the watershed may come from diverse groups. Whoever they are, and whether they play an advocacy role or are involved in a consensus-building watershed management process (such as Trudy Coxe described for Massachusetts), it's critical to recognize the needs of all citizens in the basin.

People are the key to future watershed management. Whether they actively participate or whether they do not, all citizens' rights must be included in our decision-making process.

No matter how large or small our watershed may be, we all have a role in its future.

Thank you!

Parker W. Keen
Land Manager, Cargill Fertilizer Inc.

Good morning. I appreciate the opportunity to share some thoughts with you at the beginning of this panel discussion. I would like to give a very quick overview of some of the kinds of things going on not only within our company but also within private industry: some of the opportunities that we have really just begun to tap.

I will give a short overview of Cargill's specific programs that relate to watershed management. It may appear to be a PR piece, but it really isn't. It's intended to be an introduction to how we in private industry can touch on issues that are of concern to this conference. Then I will talk about a specific issue for the state of Florida in which we have been involved in our mining operations, so that you can understand how we approach the concept of watershed management in an extractive industry such as phosphate mining.

As a corporate employer, Cargill has the opportunity to touch many thousands of people through programs that it initiates as a corporation with commitment from top management. We have the opportunity to communicate values and other things to our employees in such a way that we can really touch on issues that are very important to sustainability in this country and even around the world. Cargill can reach over 75,000 homes with concepts such as our Water Matters program.

In February 1995 Cargill initiated a program called Water Matters. This program has strong commitment from the CEO and the Chairman of the Board of Directors all the way down through the Cargill corporation. It was implemented in the corporation not only in this country but in offices throughout the world. It's been done in coordination with the Conservation Fund, and Larry Selzer has been very involved. We have also coordinated with National Geographic and used some of their materials. We have been communicating the importance of this type of program in many different ways and throughout the communities where we operate. We highlighted the Water Matters campaign in the Cargill employee magazine, at employee picnics, and at customer appreciation days and events.

The core objective of this program is employee education and awareness. We are trying to link volunteers and resources in the community to look at grass-roots ways of conserving water and making water conservation a priority in the homes of all of our employees. And, of course, as we do this, related opportunities open up through the school system and civic activities, so we can spread the Water Matters message even further.

We have sponsored field trips for school children of all ages, involving them in the Water Matters program. We have also had "Adopt-a-River" science projects, where we've had cleanup campaigns within

river systems all across the country. We have sponsored a wetlands habitat studies program at the Sunflower School in Canada, which is just one example of the way we work with different educational outreach efforts. This particular program dealt with Kindergarten through third grade.

We want to show employees that our water conservation message is not just something for them to take home, but something that the corporation is very committed to. To demonstrate our company's commitment, we are also embarking on programs within our facilities and our operations. We've had facility tours so that people can see how this commitment is being put forward.

Cargill has had science fairs and other cleanup programs in the state of Florida. This effort is a component of the larger Cargill Cares program, which has been fully implemented throughout the corporation.

Let me touch briefly on watershed issues that Cargill is dealing with in Florida. Our mining lands in central Florida lie on both sides of the Peace River. We are very much involved in the Peace River watershed. The river flows for over 100 miles from the Charlotte Harbor all the way up to Polk County, Florida, right up through the center of the state. We have initiated a process of looking at pre-mining land uses, looking at the watersheds and how they have been fragmented, looking at the Peace River and how the tributaries to the river have been abused in some cases.

We are working through our mining plans and reclamation designs to establish what we would call habitat networks. This is really ecosystem-based watershed management, keying the preservation areas where there will be no mining to the reclamation areas after the planned mining is completed. The objective is that when we are finished, we will have actually restored the water basin to be more of a functioning system than it is today. Some 60,000 acres of our private land are going to be involved in this ecosystem-based stewardship program. This program is not only being accomplished by our company, but by the entire industry.

That's just a brief overview of how Cargill is using the watershed approach in Florida, and where Cargill has committed significant resources as a corporation worldwide.

DISCUSSION

Larry: I have some questions that I will address to individual panel members, but I hope that other panel members will feel free to respond also. My first question relates to something that Trudy Coxe said early on in our panel discussion something that struck me because it touches a concern of mine: That is, as everything moves aggressively to the local level, how can we ensure that local people and organizations are prepared to deal with the responsibilities they will inherit? Trudy, could you comment further on how the state of Massachusetts is approaching capacity building at the local level.

Trudy: First of all, let me say that Massachusetts' idea to commit $2.5 million in grants for technical assistance and capacity building really came as a result of lots of discussions with many watershed

leaders in the commonwealth. Some of them are here today; all of them recognize both their strengths and their weaknesses. In general, watershed groups are very good at education and outreach. Everyone knows that advocacy is one of their special strengths. In Massachusetts, the quality of watershed associations varies. Some have strong staffs and executive directors. Other groups are just beginning to get off the block. Our grant program is going to be competitive in ways that I hope will encourage capacity building. Watershed groups and other nonprofits are invited to submit proposals to the state on how they want to attack a particular problem in their watershed. We are inviting them to work with each other and to propose grants that involve local officials or local planning agencies or others. The program is designed to take some of the burden off of the state and put it into the hands of the locals, who we believe can really advance the vision of watershed protection.

Parker: Let me add just a quick comment. Charlie mentioned earlier the Charlotte Harbor National Estuary Program in Florida, which is just being formed with some funding help from EPA. I serve on the citizens' advisory committee for this NEP, along with many, many other citizens. From the perspective of that committee, I can see how logical it is, and how productive it can be, to involve the local citizens.

Larry: To a large extent, I see the environmental crisis as a crisis of creativity. By soliciting a bare minimum of public input, national decision makers have failed to tap the well of human ingenuity on this and many other issues. Suzie, I know that in the Mississippi watershed, you are interested in where, how, and at what point we engage citizens in the process of watershed management. Could you expand a little on how that happens in the Mississippi basin?

Suzie: There are, I believe, over 54 local, state, regional, and national agencies that have some regulatory authority over the Mississippi River. Even setting aside the 33-state watershed and looking at the 10 main-stem states, all but two of those states have borders defined by the river, so the Mississippi tends to be forgotten at the border line. We need to look at it as a whole system and make sure that indeed citizens are involved in the process.

I haven't any greater insight than to stress how important it is to bring all citizens to the table. I would urge any government people who may be here to think through how you are approaching citizens. Bring them on board early in the process. Make sure the invitation is extended to all; don't assume you know who ought to be there. Use organizations such as River Network based in Portland to find other people who are interested in rivers and watersheds. Consider basic questions such as, Do you know the group of citizens you are working with represents the basin diversity in terms of the issues you are trying to solve? Simple things like meeting locations, and how you set up a room so that is accessible to citizens, can also be important.

Make sure that the leadership in the ongoing process is selected by the group. And as Trudy just mentioned, make sure that there is money and support so that the collaborative effort can move ahead, so that the citizens don't have to pay for the process out of their own pockets. Listen to and incorporate what citizens are saying into any subsequent government action.

Larry: I've often thought that technology is a good avenue for involving citizens. I have found that to be

so in my own experience, when working with GIS mapping capabilities. GIS is a great way to graphically involve citizens in decision making. I'm interested, Parker, how at Cargill and in some of your previous work in the phosphate industry, you have used some of these new technologies to develop some very innovative solutions, including the Life-of-Mine planning. How does that work?

Parker: At Cargill, we've used several different GIS systems to characterize existing land forms and ecosystem functions and to determine what the overall condition of the environment is before we begin a particular mining operation. In doing this, we work with local government as well as the state and federal regulatory agencies. Later on, when we have concluded the mining operation, this GIS-assisted information can serve as a tool for restoring ecosystems and the environment to the condition that existed when we started. That is the goal of Life-of-Mine planning. In my earlier experience with the U.S. Army Corps of Engineers, this kind of holistic planning is something that the Corps tried to develop years ago to move beyond looking at pieces of a basin one at a time to taking an entire watershed basin into account but was not successful then because we lacked the GIS tools we have today.

Larry: Charlie, you are on the other side of that issue on the local government level. Do you have comments to add?

Charlie: I agree that GIS systems are very valuable tools. They can help us fix images in time. We all have a penchant for trying to see snapshots in our own lives and in public matters. It is really impossible for us to perceive geologic time. It is also often difficult for us to keep biological time in perspective to watch that tree in the back yard grow, for instance. Environmental change is also difficult to see, and GIS systems can help us see it. They can help us measure changes that are incremental in achieving a vision for our watershed. A GIS system can help policy makers capture a vision and communicate it to the public, and it can help measure our incremental successes along the way to achieving that vision. It's a good interpretive tool.

Larry: The issue of time is very interesting and very critical. A key question in my mind is how do we reconcile the powerful tension between our short-term American society and the inherently long-term perspective needed for decision making with respect to natural resources and watershed planning. We have governments that think in terms of two-, four-, and six-year elections. We have corporations that think in one- to three-year planning increments. Wall Street thinks in terms of three-month financial reporting increments. Charlene, I'm interested in the tribes' notion of historical perspective and context, and the circles that you mentioned. How can we begin to reconcile the multi-year aspect of watershed planning with the short-term time frames that most of us face in our decision-making?

Charlene: One thing that we need to agree upon is that we have a common goal. To achieve that goal, we need to have indicators. Some of these can be natural resource indicators such as salmon and shellfish. Another indicator is human health. We need to have the common goal of protecting human health, but also realize that human health itself is connected to the watershed. Within the watershed, we have wildlife and a diversity of natural resources. I think the most important thing is that we have a foundation, which links us to the past. From that foundation, we can determine how far we have come, and possibly determine the mistakes that we have made. For future generations, I think one of the indicators is the

ethic of each individual. We need to be aware of what impacts our actions will have on future generations.

Trudy: I would like to tie a few thoughts together, on the theme of time. When taking a watershed approach one really shouldn't think about how long a particular governor will be around or in terms of immediate political issues. That is why, in creating a vision for the future of a watershed, the larger the base of people who participate in creating that vision, the better the results. We were talking about technology: I was really struck when one of the classrooms doing work on the Neponset River watershed gave me a lesson on how they were using global-positioning technology and equipment to be exactly precise in locating every single stormdrain that drains to the Neponset. The goal is for those kids to come back 20 years from now to see if those stormdrains are still around.

If we don't reach out to the whole variety of people who live in a watershed, if we don't elicit their ideas on what the watershed should look and feel like for their children, then I think we miss the point. That process of vision creation involving as large a group of people as possible is very important to the watershed approach. And reaching out to school kids, who are going to be around much longer than we are, is even more important.

Charlie: I would like to add an observation. As we set a vision for a watershed, a leader's role is to keep the vision alive, and to keep it moving ahead. Perhaps as scientists and policy advisors, we can highlight measurable results that fit the vision so that everyone can see these incremental results as they happen. So we need not always ask, when will the park all 10,000 acres of it be finished? We can ask, for example, when will the first trail be opened? In saying this, I am thinking of questions that I am often asked, and I'm not always comfortable saying, well, that it won't be finished in our lifetime.

Larry: Rita Mae Brown, a very smart lady, once said that a good definition of insanity is doing the same old things in the same old ways and expecting different results. Trudy, I was reminded of Rita Mae Brown when you were talking about restructuring government. In your position as Secretary, you have executive fiat in some cases, but very often, it is difficult to get existing fiefdoms in government to suddenly broaden their way of doing things and focus on a cross-jurisdictional issue like watershed management. Can you tell us a little more about how that is working in Massachusetts?

Trudy: I came into the job of Secretary of Environmental Affairs three years ago and thought it would be an easy thing to get people to work together, given that all five state agencies I work with have environmental protection as their mission, and all of the professionals in all five departments are dedicated to making the environment of Massachusetts better. I have great regard for every one of them. Little did I know that it was going to be so hard to get the Fish and Wildlife people to join forces with Department of Environmental Protection (DEP), and the DEP people to join forces with the Department of Environmental Management. It has been an ongoing challenge to move that process forward. Fortunately, many of the agencies are planted with people who think in terms of better and newer ways of doing things, and I have relied a great deal on those people. These are people who demonstrate with sheer will and enthusiasm the need for all of us in state government to come together to protect the watershed. We cannot do the job working independently from one another.

One of the points I try to hammer home is that if we can't overcome differences between sister state agencies to develop a better rapport among people who share a basic mission, how can we possibly hope to develop rapport with people who have missions that are different from ours? It does take time to change institutional culture, and this is an ongoing process. One of the forces that have helped bring state agency people together is the watershed associations; these people push us to coordinate our efforts. The bottom line, I think, is trust. Who are our friends on watershed issues inside and outside of state government? Is watershed management a lasting project? Is the governor really committed to it? The process is one of building trust, and it doesn't happen overnight.

Parker: I appreciate all of Trudy's comments because in Florida we have embarked on a system of ecosystem management. This approach has allowed us to do some things that would not otherwise have been possible. In our Life-of-Mine permitting system, this means going beyond just water quality issues to preserving an entire ecosystem base. This might include, for example, saving wildlife habitat in second-order stream systems. As part of our permitting plans, we are preserving key component areas, which can include not just wetlands, but associated uplands and native range systems, which can be very important in Florida. We have seen the Florida Department of Environmental Protection, the water management districts, and the Corps of Engineers all working in unison, and it's been very refreshing.

Trudy: I think there is another issue. That is that all of us in state governments whether in Massachusetts or California or any other state are under the gun more than every before to be accountable to the taxpayer. People expect us to spend their money well. One thing that state officials can do is build budgets around watershed areas. We can use budget issues to pull people on board.

Suzie: As we are trying both to protect our resources and conserve our tax dollars while working collaboratively with the people who need to be involved in the decision making process let's also try to coordinate our efforts in terms of technology and data. We were talking earlier about GIS mapping systems. Let's try to make sure that the various levels of government are all working with the same maps and the same data sets, so that everyone is making decisions on the same playing field.

Larry: I would like to close the panel by invoking Oliver Wendell Holmes, who said, "To live fully is to be engaged in the passions of one's time." I can say without reservation that our panelists are a group of men and women who have lived life fully. They have been truly engaged in making a difference in the one really new issue of our generation: environmental quality.

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Getting Down To Business: Frameworks for Action
Tuesday, June 11, 1996

Special Excercise-Gathering Responses From Large Groups

Edward Dickey
Chief of Planning, U.S. Army Corps of Engineers Civil Works Program

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Effective community involvement is an essential component of the watershed approach to environmental protection. But how do you handle the logistics of soliciting and analyzing input from large groups of people at public meetings?

A process called the "large group response exercise" has been developed to help community organizers manage public meetings groups up to several hundred people to achieve focused results. To demonstrate how the process works with an actual group of people, moderator Edward Dickey engaged Watershed 96 conference participants in a large group response exercise, using techniques developed by the U.S. Army Corps of Engineers. Three questions concerning watershed management were posed to the group. (See box regarding the specific questions and most frequently given responses from the exercise.) These questions are not formulaic; in other words, the questions posed to any particular group of people are necessarily tailored to the particular problems confronting their community.

The exercise itself consists of a four-step process for eliciting, displaying, and summarizing responses from any large group. In addition, there are important steps before and after the exercise, namely the pre-exercise preparation and set-up and the post-exercise analysis. This entire sequence of steps is summarized below:

Procedure:

Pre-Exercise Preparation and Set-Up. The heart of the large group response exercise is a set of questions

related to the purpose or theme of the meeting. Typically, three questions are used for an exercise. It is important that these questions be carefully framed before the exercise.

Other pre-exercise activities include preparing a response sheet for recording answers (with a designated answer block for each question), preparing a moderator's script and visual aids for exercise presentation, and visiting the meeting site.

Two set-up tasks are required on the day of the exercise. First, banks of flip charts on stands are set up, with one bank of charts dedicated to each of the selected questions. Each bank is usually three or more charts wide and forms a "wall" of paper. The "walls" are put in separate locations in the meeting room or in a nearby room. Several marking pens and a collection box (for completed response sheets) are placed at each "wall." Second, if prepared in advance, response sheets are distributed to exercise participants. It may also be necessary to provide pens or pencils and a writing surface (book, pad of paper, etc.).

Exercise Step 1 Questions and Responses. A moderator introduces the exercise, explaining its purpose and the procedure to be followed. The moderator explains the first question and then allows participants three minutes to write all of their responses in the first block of the response sheet. This question-and-response format will be repeated for the remaining questions.

Exercise Step 2 Most Important Responses. The moderator provides participants with a final three minutes to individually review their responses and to select and mark (by circling or checking) their "most important" response to each question.

Exercise Step 3 Wall Walk. Participants visit each of the flip chart "walls" of paper to display their "most important" responses. Each "wall" should be attended by an assistant to help participants, to move completed sheets of paper to nearby walls, and to summarize responses. When all of the participants have displayed their "most important" responses, the moderator visits each "wall," reviews the responses with the assistant, and notes a few key points that summarize the results.

Exercise Step 4 Summary. When the participants have reassembled, the moderator presents the summary of the responses to each of the questions. Participants may wish to discuss the results.

Post-Exercise Analysis. Further analysis after the exercise can range from simply reading the response sheets to be fully informed about participants' ideas, to key word and content analyses of the responses. (The summary responses from the Watershed '96 exercise have been put to use by several organizations that helped sponsor the conference.)

Time:

The four exercise steps that are conducted during the meeting can be completed in about 45 to 90 minutes.

Materials and Room:

Materials needed to conduct a large group response exercise usually include: flip charts (pads of paper and stands), markers, tape (or pins), response sheets, pens or pencils, and signs. Other materials can be used to fit special exercise needs. The exercise meeting room should have writing surfaces (tables, or participants' pads, books, etc.), wall space suitable for the display of completed flip chart pages, and adequate space for circulation during the wall walk.

Benefits:

The large group response technique is:

- Quick. Full participation by a large group can be completed and results are known in about one hour.
- Inexpensive. Costs can be limited to flip charts and work sheets; expenses for separate break-out rooms and small group facilitators and recorders are minimized or eliminated.
- Easy. The steps are straightforward; equipment and materials are familiar, readily available, and not readily flawed.
- Documented. Results are immediately self-recorded on response sheets, flip chart pages, and summary notes.

Need more information?
For more detailed information, please contact:
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Special Guest
Wednesday, June 12, 1996

The Honorable Bruce Babbitt

Secretary
U.S. Department of the Interior

When I learned about Watershed 96 and about your efforts I said to myself, "There's some-thing real big happening up there in Baltimore." I decided that, no matter what it took, I had to be here.

I believe that out of this movement the Watershed movement is coming the beginnings of a brand new chapter in American environmental history and in American community history.

What I would like to do very briefly is explain to you why I've come to the conclusion that I have just stated.

It began about a year ago, in April of 1995. It began to dawn on me that this new Congress that had come to town was not out to do any good for the environment, was not going to grant me any favors, and in fact had a radical slash-and-burn agenda, beginning with gutting the Clean Water Act, moving to beginning to close national parks, and trying to destroy the Endangered Species Act. I woke up one day after a frustrating session of getting nowhere and I said to myself, I think it's time to leave town. I think it's time to pack my bags and get the hell out of here. What I meant by that was I felt it was time to get out on the American landscape and try to understand why this "disconnect" because all of a sudden there was this radical agenda, and I don't for a moment believe that's what the 1994 election was about. So I thought I better find out what's happening across this country.

I began one spring day. I thought what I'll do is go to Cleveland and see if I can find the exact place where the river burned in 1969 the burning Cuyahoga River. And I went out, on that spring day, and found a couple of folks with a boat who took me downtown. And on that spring morning, we went up the

Cuyahoga River to the bridge trestle where the river had burned. What I saw before my eyes was really extraordinary. I saw a river reborn. I saw businesses, restaurants, walks along the river. I saw fishing boats coming up the river, and as we came to this spot where the river had burned, a blue heron flew down out of the sky, looking for its breakfast in that river. And I subsequently went out to Lake Erie, and I saw a lake pronounced dead in the 1960s reborn. I began listening to the people in that community explaining how it had happened. And then I began to see something that I really had not understood or appreciated at all. I began to see that as the waters were restored, the waters were restoring the community, that Cleveland was again moving back to the waterfront that it had abandoned at the beginning of the Industrial Revolution, that the public places were being re-created, and that the community was being drawn together as the waters were restored. As I progressed up the Cuyahoga River, I met citizen groups who explained to me, it's not enough just to clean up Lake Erie, and it's not enough to have an effort at the mouth of the Cuyahoga River. This is a watershed.

And I began progressing, in subsequent visits, up the Cuyahoga River and out on the land, where I heard citizens saying to me: This is not just about Lake Erie; it's not just the Cuyahoga River. It's about all of the waters and all of the land; it's about how we as citizens live on that landscape and how it is we relate to the watershed. Well, with that in mind, I began looking, as I traveled down the Jersey shore, as I made my way through the communities of the Hudson River Troy, Peekskill, Poughkeepsie everywhere I turned, what I saw was not federal or state officials, but communities who were taking and integrating federal and local resources and using these laws to their own ends to restore their watershed and their communities.

Now, I'll admit to you I also had some light-hearted moments on the way. By the purest of coincidences, I decided to spend a day on the Chatahoochee River, which coincidentally runs through the district, outside Atlanta, of the Speaker of the House of Representatives. We got out there one summer day with a flotilla of canoes, and a whole lot of citizens and every media outlet in greater Atlanta. It turns out that the Chatahoochee in that area is a national recreation area. And we posed the question: Is there anyone who believes we ought to gut the Clean Water Act? And is there anyone who believes that in the United States of America we have too many national parks. Well, I have to tell you, by the time that day was over, a powerful message had been sent to Washington. The Speaker of the House stepped forward and pulled the Park Closure Bill from the calendar of the House. It's not been seen since.

Now that's the point at which I started to see the connection; I started to understand that this grass roots revolution that's taking place hadn't quite been heard in Washington. I came away from that summer confident that things are now moving in the right direction because once the voice of your community makes its way back, there isn't any question about the outcome of this process. Now, I've seen this happening in a lot of other places. Is there somebody here from Columbus, Ohio? We spent an extraordinary day out on the Little Darby Watershed watching a community taking charge of that watershed. I was in Seattle last fall in a place called Piper Creek, where a community in this case a neighborhood had gone out and looked at Piper Creek, and a couple of schoolteachers had gotten a bunch of school kids out there, and they said: We're going to clean this creek up, and we're going to get salmon back spawning in this river. They went out, and first of all found out that the water treatment plant was leaking and that they had to go after the city to clean up the water treatment plant, and then did habitat

restoration along the creek. Then, in a profound act of optimism, the high school kids planted some salmon. And I was there three years later as the first salmon out of that creek had made their journey out to tide water circulating through the Pacific and coming back home. You all know the examples.

What I want to say to you in conclusion is this: The next chapter in conservation history is going to be written in watersheds by communities for a couple of important reasons. The first one is, as you all understand, there is no other way to relate to the land we live on. The water that we drink and that is in our communities is an exact reflection of what is happening on every square acre of land in the entire watershed, from the mouth of that river to the reaches of every single tributary. Every other program, every other approach is, by definition, piecemeal. The one integrating possibility that we now come to is relating to the whole, and we need to understand and, when I say we I mean us in Washington that that brings forth a profoundly different set of relationships because watersheds in their complexity, in their diversity, their incredible balance, cannot be managed from 3,000 miles away by any organization, no matter how well-intentioned. We also have to understand that the environmental laws passed one at a time over the last 20 years have been effective. We've won a lot of the big victories, but what we find with single-track administration of the Safe Drinking Water Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Endangered Species Act, the Land Management Act, is a simple reality and that is that the easy victories, that can be done by remote control, have in large measure been addressed. Now we're talking about complexity; we're talking about how those laws interrelate to each other. We're talking about how we change attitudes. We're talking about a culture being changed in a way that will permit thoughtful land management, that will move communities to see the entire landscape and understand that it can't all be done from Washington. It can't all be done by administrators with a different set of laws; ultimately, some one has to bring them together and transform them from statute books into attitudes in the hearts and minds of communities. That is the next generation as surely as John Muir set off one generation of land protection, as surely as Rachel Carson set off another generation that led to the EPA's [charter] set of issues.

This time we've come full circle, right back where we started to communities on the land who see it whole and who are willing to take the initiative, take these laws and say to all of us: You're not the solution in Washington; you have potential to empower us and help us. I believe that feeling is now out there across this landscape, ready to take off. That's why I'm here: because I believe we are ready to take off, that you are present at the creation and that you together can revolutionize the landscape and the communities that must and always will be on the landscape.

Thank you very much.

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Luncheon Address
Wednesday June 12, 1996

Telling the Story: Communicating Complex Environmental Issues to the Public

Judith Gradwohl
Director, Office of Environmental Awareness, Smithsonian Institution

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I am here to talk about my experience at the Smithsonian Institution with public education on science and envi-ronmental issues. My program the Smithsonian Office of Environmental Awareness provides a bridge between technical information and the public. Any public information program including museum exhibitions has to be grounded on really strong science, and that's what you all provide. Many people in this room have helped us by contributing technical information.

I want to talk about how we take scientific concepts and turn them into exhibitions. I love developing exhibitions because it's so much like writing a book and then being able to look over everyone's shoulder and watch them react to every page, to every single chapter.

I've developed two major environmental exhibitions for the Smithsonian. The first was called "Tropical Rainforests: A Disappearing Treasure," which opened in 1988 and circulated around the country until a couple of years ago. The second is called "Ocean Planet," which opened here in Washington last year and closed last month; it will open in San Francisco at the Presidio in August. These are not typical Smithsonian exhibitions because they are based on concepts rather than objects. Usually when constructing an exhibition, you have a series of paintings or other type of artifacts, and you weave a story around them. With exhibitions like "Tropical Rainforests" and "Ocean Planet," we first develop a theme, an overarching educational message; then we go ahead and choose the particular issues we want to talk about and essentially weave stories around them.

The process is very collaborative. I started "Ocean Planet" with a large conference and then a series of workshops to try to frame the issues. We then move from a list of issues to space allocation. For example, we take a room this size and say, OK, how much of this space do we want to devote to science underlying ocean conservation? How much to anthropological issues? How much to environmental issues?

Once we come up with a space allocation, then comes the fun part, which is working with designers, lots of different kinds of contractors, lots of creative thinkers to decide on the best medium for conveying each type of message. We develop a model and we walk tiny model people through it to see what it's going to be like. We conduct a global scavenger hunt for information, for objects, and for photos to illustrate all the issues we're trying to present.

In the rainforest exhibition, for example, we wanted to explore all of the difficult issues that are causing deforestation and spent a long time deciding how to get people to want to spend their leisure time looking at the ways forests are destroyed. We ended up with something that looks like a pop art gallery of lots of different types of sculptures. The Brahma bull symbolizes cattle ranching, which is a huge problem for forests throughout the New World tropics. We decided we wanted a life-size model of a Brahma bull. I delegated this task to my assistant, Elliot, who was brand new on the job. So Elliot consulted the yellow pages we've accumulated all the yellow pages for all the major U.S. metropolitan areas for just this sort of work and first called the American Cattleman's Association, which referred him to the Brahma Growers' Association of Texas. Maybe it was Elliot's beginner's luck, but the guy who picked up the phone at the Brahma Growers' Association of Texas had just ordered five Brahma bull models the day before from a guy who lives outside of Paris, Texas, and makes life-sized Brahma bulls for a living. His name is Burt Holster, and he was very happy to make a special order Brahma for us, which is very beautifully painted. This is a case where the scavenger hunt went very well.

Sometimes the hunt goes awry. In this same rain forest exhibition, we wanted to have an army-ant swarm to illustrate the interactions between animals in a forest the intricacy of those interactions. My own research background happens to be on ant birds that associate near ant swarms. What happens is this: The ants, as they move along the forest floor in wide columns, flush out all the insects, and birds hang out above them, making a living by following the ants around and eating the insects that are flushed. So we planned this great diorama with a taxidermic bird and with ants. We rounded up some hundred of ants from Harvard, where they had spent 35 years in formalin. The formalin had caused them all to seize up so that they looked like little balls of legs. The problem was how to unfold these ants and get their legs glued to the bottom of the diorama. We tried several "relaxing solutions" recommended by our taxidermist, and none of them worked. At that point, we were beginning to panic because we already had a lot invested and this particular exhibit had a space allocation. There was no choice; the ants had to be pinned by hand. It takes 13 pins to pin one ant. You need two pins crosswise on each of their six legs and then one through the body. We tried enlisting the help of volunteers for this highly specialized task, but that didn't work out. It turned out that I was the only one who could pin an ant in under a minute, and I ended up pinning all 300 ants, which I hope you'll see if you go to the exhibition. I pinned each of their six legs and then used superglue to put them on. (This falls in the "other duties as assigned" category.) I

learned a lesson on that one not to get too tied to a concept before you work through the logistic details of actualizing it. As I said earlier, every object in an exhibition has its own story.

In fact, any exhibition and any mode of public education is really a form of storytelling. One of the hardest parts of exhibition work is figuring out how to boil down, let's say, 10 years of research into something that people can read about in seconds or minutes. We know that people do not spend much time on any single label, so we try to limit label narratives to about 50 words. Basically, exhibit labels tell extremely short stories about a piece of research or a particular fact. One key is figuring out how to space the labels. You can't ever expect anybody to read everything in an exhibition, but you want enough stories to jump out so that there's something for everyone.

We also use lots of different types of media in order to attract interest. Basically, we do anything we can do to slow people down as they go through an exhibition. One of the ways that we communicate is through photographs. We also create interactive exhibits. One of my favorite interactive exhibits was in "Ocean Planet." It consists of a case with products from a grocery store in it; people were invited to scan the bar codes on the products, and the computer screen on the top would show what products inside these packaged foods were from the oceans. My favorite example is the alginates in beer that help keep the foam from collapsing on contact with lipstick or detergent. In fact, almost anything you can find on a grocery store shelf has some form of alginate, carrageenan, or beta carotene, and this particular exhibit makes that point.

One of our goals in the "Ocean Planet" exhibit was to educate people about watershed preservation. To evaluate the impact made by the exhibition, we did surveys before people entered, and when they exited. We also followed people around with stopwatches to see what they did when they were in the exhibition, so that we could get a feel for how much time they were spending where, what caused them to go from one exhibit to another, and which exhibits they paid the most attention to. We also checked to see if time spent at an exhibit had any correlation to what people remembered at the end of the show. Significantly, the exhibition reduced by a third the number of people who thought oceans didn't affect their lives. Most of the people we talked to as they entered felt that oceans affected their lives in one way or another. But the exhibition made a huge difference among those who did not go in feeling that way; many of them walked out feeling, yes, oceans do affect my life after all.

I was also greatly heartened in that the exhibition more than doubled the percentage of visitors who felt that ocean problems are the consequence of human actions. On entrance, many people would say, oh, the problem is mainly oil spills; it's other types of huge pollution problems. After the exhibition, they were saying, well, the problem has a lot to do with human activities; it has to do with the way things are regulated. They left looking at oceans from a more holistic viewpoint looking at a number of different issues feeding into ocean problems, not just pollution incidents or just overfishing. We nearly doubled the percentage of the audience who felt that they could help the oceans by changing their own consumption patterns. People came up with their own wording on this, but they really did target their consumption patterns and what they do at home. I think that bodes well for at least the household hazardous waste component of polluted runoff and for people's relating their personal lives to watersheds.

The basis of all our public outreach work on environmental issues is as I said at the beginning strong research and good information, the advice and review that experts like yourselves provide. This conference is looking at how to get different sectors to work together more effectively and come up with a more holistic view of watersheds. That process is definitely going to require public participation. I think that exhibits like "Ocean Planet" and the various kinds of outreach efforts that you are involved with are showing that we can make a difference in public attitudes. Two million people came through the "Ocean Plant" show, and 33 percent walked out thinking that they could change their consumption patterns and help the oceans. That's a huge number of people. There are lots of ways to get the word out. I hope you'll all consider working with local museums and zoos and aquariums and nature centers and any other outlet you have because the information that they give out to the public is only as good as the information that they get.

Thank You.

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Achieving Results Community By Community: A National Satellite Video Conference
Wednesday, June 12, 1996

Remarks
The Honorable Carol M. Browner

Administrator U.S. Environmental Protection Agency

It is a real pleasure to be able to join all of you here in Baltimore today, as well as those who are participating by satellite.

Twenty-six years ago, the people of this country Democrats, Republicans, and independents joined together to say: "We must stop the pollution. We must save our natural heritage."

And together, we made tremendous progress. Progress in cleaning up our air. Progress in cleaning up our land. And progress in cleaning up our nation's waters.

When President Clinton came to Washington, he called on environmental leaders, on business leaders, on citizens across this country, to help continue that progress.

President Clinton has always believed that environmental protection and economic progress go hand in hand. We do not have to choose between our health and our jobs. In fact, the two are inextricably linked.

Protecting our environment means protecting public health. It means protecting where we live and how we live. It means real everyday benefits for American communities fresh air to breathe, land that is safe to live on, clean, safe water to drink and fish and swim in.

Today, communities across the country are benefiting from the President's leadership on the environment.

The Clinton Administration is making sure that states and communities have the resources they need to keep raw sewage out of rivers and off beaches. For the first time ever, President Clinton has proposed a revolving loan fund to help communities protect and upgrade their drinking water supplies. And, we are enforcing tough standards to keep toxic pollution out of our waters.

With the President's leadership, we expanded the public's right to know about toxic chemicals in their communities. We have nearly doubled the number of chemicals that industry must report to the public.

This week, EPA released to the public a National Listing of Fish Consumption Advisories showing that in too many communities, contamination means that people are still advised not to eat the fish from their local river, their local lake.

This week, EPA is also releasing a comprehensive report that, for the first time, gives us a set of environmental measures a baseline showing that we are making progress in improving water quality but we still face many challenges.

Across this country watershed by watershed communities are coming together to meet those challenges. At today's conference, we are hearing the good news about what can happen when people come together to protect their watershed to protect their health, the places where they work and play and live industry, government, citizens joining together to find the solutions that make sense for their watershed, their community.

There is no doubt in my mind that an informed, involved local community can do a better job of environmental protection than some distant bureaucracy. You here at this conference are the advocates, the leaders, in protecting water quality in communities across this country. And community by community, we are seeing results.

In the San Francisco Bay Delta, we ended 30 years of water wars, by recognizing that the competing demands for scarce resources had to be solved not through continued confrontation but by building consensus. Farmers, families, and fishermen all have a right to water. People joined together, and now all will have the water they need.

The Great Lakes Water Quality Initiative will restore the health and the economy of the Great Lakes, by removing toxic chemicals from the lakes, protecting a drinking water supply that serves 23 million people, protecting wildlife, fish, and people who eat fish, in accordance with the latest and soundest scientific findings. All because the people of the Great Lakes region some of whom are with us today joined together, with the help of the federal government, to protect their health, their environment, their economy.

The Clinton Administration's Everglades Restoration Plan aims to ensure that future development in South Florida will be integrated with the preservation of natural areas. Through this plan, we can meet the needs of farmers, the needs of urban areas, the needs of the natural system and we can save the heart

of the Everglades the heart will once again pulse with water.

All of this environmental progress has been achieved, by all of us working together, despite the fact that during the past two years we have experienced the most severe Congressional assault on environmental protection in decades.

In the battle over the budget, in the battle over the Clean Water Act and other environmental laws, President Clinton stood firm for public health and environmental protection. As a result of the President's leadership, vital protections are in place and will remain in place.

But the price of a clean, safe environment is that we must always be vigilant. The responsibility will always be ours to protect our health, our natural resources, our children's future. The job is not done.

- One American in three still lives in an area where the air is too polluted to meet federal health standards.
- One American in four still lives near a toxic waste dump.
- Forty percent of rivers, lakes, and streams surveyed by the states are still not suitable for fishing or swimming.

President Clinton has called on all Americans to come together, to restore the bipartisan commitment to the environment that served this nation so well for the past generation.

I ask you to take what you learn at this conference back to your communities. Use it to strengthen your efforts as advocates and as leaders, to achieve for your community what every community deserves safe, clean water for all.

Let us join together community by community, watershed by watershed to protect our health, our economy, and our communities so all of us and our children and our grandchildren can enjoy a healthy and a prosperous life.

Thank you.

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Achieving Results Community by Community - A National Satellite Conference
Wednesday, June 12, 1996

Remarks The Honorable Sherwood Boehlert

U.S. House of Representatives (D-NY)

It is good to be with you today. I have a series of questions that have been asked of me, and I'll try to stick to the script by addressing these questions, so that I don't wander. You know how politicians are; they have a tendency to wander all over the place.

What is your vision of water-related environmental policies and programs? First of all, I envision a partnership between the public and private sectors. They are not adversaries, and should not be viewed that way. We all really want the same thing. Clearly, we've got to do more to improve the quality of our nation's lakes and rivers and harbors. I think the American people will accept nothing less.

Since passage of the Clean Water Act in 1972, we have made enormous gains in cleaning up our nation's waters. However, these gains have been primarily in the area of point source pollution. Municipalities and industry have spent billions of dollars over the last two decades on limiting effluent discharges. Now we need to shift the focus of water improvement efforts to nonpoint source pollution. Today, well over 50 percent of water quality impairments in the United States come from nonpoint sources of pollution runoff from fields and streams and parking lots and construction sites. Since 1972, the federal government has put more than $60 billion into the control of point source pollution money well spent on the building of wastewater treatment facilities. Over this same period, the federal government has provided less than $2 billion to control nonpoint source pollution.

Clearly, we must put greater resources into efforts aimed at assisting farmers and other stewards of the land in controlling our largest remaining source of water pollution. Watershed management, as exemplified by the New York City Watershed Program, is the future of water quality protection. Urban and rural, point and nonpoint source pollution control must be coordinated to provide the most effective,

most reasonable protection of our nation's waters. I have been privileged to serve in a leadership capacity to make the New York City Watershed Program a model for the nation. I'm well aware of the challenges that watershed management poses to all involved, but with thoughtful dialogue with people talking to each other and a commitment to improving water quality and the assignment of appropriate resources, we can make watershed management work across the country.

What is the future of national water quality protection legislation? Clean water legislation will have an increasing focus on watershed management no question about it and on the use of incentives to address nonpoint source pollution. Many in the agriculture community have been leery of legislative efforts to control nonpoint-source pollution. However, as we've seen in the New York City watershed, when we work with farmers on a partnership basis, we can make enormous progress. The use of incentive-based approaches is already taking shape in the 1996 Farm Bill. During consideration of this legislation, I offered an amendment providing $2.7 billion for conservation programs whose primary focus is water quality improvement programs such as the Wetlands Reserve Program, the Conservation Reserve Program, and the Livestock and Environmental Assistance Program, which have an enormous impact on improving of our nation's lakes and rivers.

Passage of Clean Water Act legislation in the closing days of the 104th Congress seems unlikely. As you may recall, we had a big battle last year. The House passed a bill; I didn't think it was a good bill. I didn't vote for it, and 185 of my colleagues also rejected it. As a result, in the Senate, Senator Chafee and others have been very wary of moving forward with a bill that did not start out as a good bill. I'd like to think that between now and the end of this session we can get something passed in the name of clean water, but I'm afraid that looks highly unlikely right now. However, it's going to have a high priority in the next session.

Would you comment on regulatory versus voluntary approaches to water quality protection and how those approaches are impacted or supported by the federal government?

Much of the remaining work needed to make our waters fishable and swimmable will involve individual landowners, and the top-down, command-and-control approaches used in the past will not work in this setting. Instead, farmers and other stewards of the land should be provided with technical assistance and the resources needed to meet our water quality objectives.

Would you comment on balancing the rights of communities and states with the need to work across political boundaries for water quality protection?

A good question. The original Clean Water Act was drafted largely in response to the degradation of our lakes and streams by upstream polluters, often from other states. The reality is: We all live downstream, and federal standards are critical to protecting all of our interests. Better coordination of water protection efforts across political boundaries is important. Again, watershed management approaches provide the best vehicle to coordinate clean water protection efforts.

Would you comment on the two large watersheds in New York seeking filtration avoidance specifically on the issue of how to protect water supplies in one region that are delivered to consumers in another region? The New York City drinking water system consists of reservoirs and delivery systems on both the east and west sides of the Hudson River. I happen to have the distinction of representing the largest portion of the 2,000-square-mile watershed. The key to protecting water in one region for consumption in another is to educate interests in both regions on the issues and concerns surrounding overall water protection efforts. In other words, people have to know that they're all in it together.

In New York state, there are long-standing suspicions between upstate and New York City. It's like two different worlds or at least it was until we got together and starting talking things through. Only through exhaustive meetings and many of them exhausted me were the representatives of New York City and the upstate watershed area able to reach consensus on how to most effectively protect water quality. Innovative approaches to water quality protection, such as whole farm planning, were developed through discussions between scientists, planners, and farmers and affected residents. Large metropolitan interests such as New York City must be willing to put real resources into watershed management. The equation for New York City was simple: Either spend $6 to 8 billion to construct to construct drinking water filtration facilities and another $300 million a year on operation and maintenance, or spend a few hundred million dollars in upstate New York to assist farmers and small communities in controlling water pollution. Now that was not a tough choice to make. New York City made the obvious choice, and all parties are better off because of it. The upstate people are happy; the city people are happy; and everybody gets a bargain in the process. Not a bad deal.

We've got something very special in America. There are very few places in the world where you can just go and get a glass of water from the tap when you're thirsty and drink it and know it's safe for human consumption. You can do that just about everywhere in the United States. We've got magnificent lakes, magnificent shorelines, rivers, and streams. We've got an obligation to protect them. We didn't inherit the Earth from our ancestors; we're borrowing it from our children. We have an atonement to make of our stewardship. But by working together, we can leave our children something that we can all be proud of.

Thank you very much.

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Remarks Katherine Baril

Director
Washington State University Learning Center
Cooperative Extension, Jefferson County

I have been asked to say a few words from the local, on-the-ground, community perspective. I have the honor of serving my community in Northwest Washington state as a local county extension agent.

We know that we are all a watershed-based people. When we see a picture of Earth from Space, we agree with the Director of the Smithsonian when he said that this image may have caused as big a change in our human consciousness and in how we see ourselves as a people as when Copernicus said the World may not be flat. No longer were we pioneers defeating a wilderness but rather connected, watershed residents of the spaceship Earth.

The Earth sparkles in space because water covers 80 percent of its surface. Less than one-half of one percent is drinkable. Imagine the world's total water supply in a large bathtub and the amount available for human consumption less than one teaspoon. One billion people go to sleep each night without clean water. If you think we have fought wars over oil, imagine what we will do for water.

We are also soon approaching the end of the 20th century. The end of a millennium has always been a tumultuous time in world history. In the 1800s the birth of democracy. In the l900s the Industrial Age and the beginning of a rapid period of resource extraction and expansion.

What dreams for the 21st Century? Balanced natural systems? Individual stewardship? Sustainable communities? Federal and state agencies working together, at every level, with local communities

solving problems? Healthy ecosystems?

Watershed planning helps us do resource management. But I'd suggest that it is also developing new skills and new forums to use civic dialogue and to develop informed public judgment as we create our common future.

We are a watershed-based people. Always have been. Early people gathered at rivers, streams, and shorelines. Water was food, navigation, commerce, and culture. Families, clans, and tribes came together to build nations.

African tribes took river names. Chinese settled in drainages. In Europe, watersheds and bioregions evolved into nation-states. In China over 1,000 years ago a rice paddy farmer could veto upland logging, not because he owned the land, but because society understood sediment could destroy downstream farms and food. Individual rights were limited for larger community well being. In medieval Spain, a family could live only as far from the central community well as a woman could carry a jug of the day's water from the well on her head. This may have been the first boundary of an urban growth area. In my watershed in the Northwest, coastal tribes have a saying that "every River has its People."

We all live in a geographic place, a landscape, a watershed, the place where we are really home. Each watershed is a unique life place, a bioregion. The soils are nowhere else on Earth. A unique hydrogeology, the landscape, the history, the customs, worldview, relationships, and connections. Not just mountains but Mt. Rainier. Not just a river but the Hudson or the Sacramento River. Not just an inlet but our bay. Each watershed has a unique sense of place and community.

In the l880s, John Wesley Powell saw the power of watersheds and recommended to the President that the West should be governed by watershed. In the l920s and 30s, water was important to commerce as streams were channeled and dredged and mountain tops were leveled to make room for railroads. Water rights were issued to farmers to ensure food for a country hungry with growing immigration. In the l940s and 50s, large engineering projects dammed and channeled rivers. Water was the "solution to pollution," the solvent, the unlimited cheap resource. Voluntary landowner action was stressed.

In the l960s and 70s, society began to get feedback that we should no longer take water for granted. Rivers in the East caught fire; shellfish beds in the West were closed; swimming holes across the country were at risk. As Sputnik reawakened our interest in science, citizens across the country came together and turned to agencies, then filled with scientists and lawyers, and demanded "Clean Water Now."

In the 1970s, the early days of the environmental efforts, it was easy to identify, monitor, and regulate smoke stack industry or pollution that came from pipes, using centralized regulations and top-down authority. Scientific based agencies developed massive regulatory approaches committed to continuing technological and industrial innovation and stressed best management practices.

Now, we face much more complex, interwoven problems. Nonpoint pollution and watershed planning

are different. Nonpoint pollution comes from people in our everyday activities: gardening, boating, expanding the family summer cottage, changing oil, removing vegetation, expanding cities, wasting water.

In early watershed-estuary programs in the l980s, such as Puget Sound or Chesapeake, we modeled new demonstrations for on-farm research. People who shared a landscape but had never met or worked together were convened to inventory and prioritize watersheds. All affected parties were invited to come together. People have the right to be involved in issues that affect their lives. Indeed, this is a central tenet of democratic governance. Consensus was encouraged, certainly not because it saved time, but to ensure that diverse voices were heard, to comfort rural landowners that they would not be outvoted by urban majorities, and to validate real concerns and force the parties to work together to develop new creative, win-win solutions that addressed everyone's legitimate needs.

Watersheds have taught us a lot in the last decade.

We all live downstream. At a time when Americans are pulled apart by the centrifugal force of the economy, globalization, isolation, and individual rights, watersheds restore balance by reminding us that we are all connected to place, to community, to our common future.

Water makes us neighbors. People understand quickly that we live in and share a natural system of air, lands, and water. Too often at a national or global level, our mind boggles and we feel hopeless. At a watershed level we can connect, put on our boots, and make a difference, and feel empowered.

Water is not a science issue; it is socio-political. Yes, we all want and need good science, but it is not enough. The challenge is to reconnect people who hold different values and restore civility. To depersonalize our conflicts, to create options for mutual gain, to each be a keeper of the other's dignity, to have open, conflicting discussions about experiences and values including pride, self-reliance, intergenerational equity, and yes, even fear.

Water issues are more complex than we thought and perhaps more complex than we can think. Future solutions will require innovation and experimentation. The oscillation of the public process will be less extreme, less polarized, and more moderate if we focus on communication and adaptive management rather than rights and litigation. It will require and is demonstrating a grassroots revolution.

Today, watershed planning may be as much about strengthening local communities and democracy as it is about resource management. The central idea of community politics is that in public life ordinary people can learn new skills, develop the power to take leadership, and solve local priority problems.

Watershed planning:

- Creates common space where adversaries can become neighbors.
- Frames issues in public terms where we can all find ourselves.

- Encourages deliberations and hard choices rather than polarization and sound bites.
- Creates commitment and support for action.

It is clear that issues that affect everyone can no longer be left to the few. We now know that complex issues require diverse input. We understand that we are moving to adaptive management; we know it is dysfunctional to continue isolated agency programs that separate wetlands from groundwater, toxics from lakes, and air from water. These approaches need to be integrated, and the community holds the silver thread that can quilt and weave them together.

We must stop convening negotiation tables that stereotype stakeholders by labeling three farmers, two elected officials, one environmentalist, and a business leader. Rather, we need new forums and processes that challenge people to synthesize their interests, see holistic views of local issues, and represent the larger community well being.

Watershed planning is pioneering new models of civic entrepreneurship and new ways to engage adversaries in intentional dialog. It is much more than consensus and no less than democracy.

Water may be the one last, best chance we have to bring our American communities back together again. As the writer Gary Snyder observed: "Of all the memberships by which we identify ourselves sex, race, ethnic, national origin, class, age, or occupation the one that is most forgotten and that has the greatest potential for healing is place. People who care for and commit to a landscape, even if otherwise locked in struggle, have at least this deep thing to share."

If you live in a high crime area, you try to move away. If we have bad schools, we start private or home schools. If we have bad air, we crank up the air-conditioning. Water the only thing we can not survive without makes us all neighbors. We know we all live downstream.

Oh, yes, there are still challenges. Can we reduce consumption, resource use, our ecological footprint, which is multiples of any other country? Can we accommodate growing urban and rural tensions? Can agencies federal and state get beyond cutting staff and block granting funds to really "reinventing" their approach? The federal government has a definite role in forging a national consensus on performance standards so that a child has clean water no matter where she lives. The state should provide technical assistance, data bases, neutral, third-party monitoring, and enforcement. But it is the locals who bring their hearts and their energy, and deliver action and stewardship.

We need more poets and musicians and fewer scientists and lawyers. We need more potlucks, parties, and dances and fewer environmental impacts statements. At times institutional barriers and bureaucratic inertia seem far more difficult and impenetrable than forging local plans of action.

If we want dramatic changes, dramatic new action, then we must also be willing to pioneer and experiment with new processes, structures, and governance forums congruent with our dreams.

In conclusion, like previous watershed residents, we gather at rivers, streams, and shorelines. We recognize that economy, ecology, and community well being are intrinsically linked, parts of the whole, and can not be separated. We recognize that as we restore our streams, we restore our neighborhoods and our faith in ourselves and each other. We can stop blaming, pointing fingers, and criticizing government and start rolling up our sleeves and turning off the water faucet. We recognize that these are "talking" issues, not a "taking."

Today, we gather at Watershed 96. We see diversity not as a problem but as our strength. We work together in a multiplicity of partnerships. We affirm that every river has its people; that we are all watershed-based people; that we all live downstream. We recognize that we no longer have the luxury of seeing in terms of "us vs.them," but that it is only us, as watershed neighbors, working together, like water gentle and strong. That is the promise that we bring together into the 21st century.

Thank you very much.

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Wednesday, June 12, 1996

The Greenwich Bay Initiative: A Watershed-Based Restoration Effort

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Rhode Island Department of Environmental Management
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Greenwich Bay, an embayment of Narragansett Bay, encompasses roughly 1.3 square kilometers of the most productive shellfish areas on the East Coast; this embayment has a history of being the state's most active winter shellfish area, with an estimated annual economic worth of $4 to 6 million. Greenwich Bay is home port to more than 2,500 recreational boats. Perhaps the most important aspect of Greenwich Bay is the bond that residents have with it, whether through swimming, shellfishing, boating, or just enjoying its aesthetic beauty. However, all of these benefits have attracted an increased density of year-round homes, and pressures from this density have resulted in wetland destruction and wastewater management concerns.

The Closure:
In December 1992, a severe Nor'Easter triggered an extended closure of Greenwich Bay due to prolonged and elevated fecal coliform bacteria levels. The closure and related re-evaluation concerning public health issues lasted 18 months, precipitating stunning economic losses to many of the state's full-time shellfishermen.

Seeing a need to pool funds and use professional expertise with the utmost efficiency in response to the crisis, a number of organizations came together in an informal coalition. Coalition members include both private and public entities and represent federal, state, and local levels of government: the City of

Warwick, the Rhode Island Department of Environmental Management (DEM)/Narragansett Bay Estuary Program (NBEP), Save The Bay, the Natural Resource Conservation Service, and Rhode Island's Shellfisherman's Association and Coastal Resource Management Council. Gradually, over a period of months, the coalition shaped itself into the Greenwich Bay Initiative, a watershed-based effort which crosses political boundaries and is administered by no single governmental body. The Greenwich Bay Initiative has proven to be an innovative and successful watershed management program.

Attacking the Problem:

The City of Warwick helped establish the overall goals of the Greenwich Bay Initiative by drafting a strategic plan (Stevens et al., 1994), which was reviewed and supported by all the primary stakeholders. The plan identified restoring the bay's water quality as a primary goal and set a three-year timeline to make major gains toward that goal. Other concerns highlighted in the plan included evaluating the bay's nutrient enrichment status, restoring high-quality habitats, and amending zoning regulations to further protect sensitive waters. From the beginning, it was clear that a cooperative, multi-agency effort would be necessary to accomplish all these goals, and specific tasks were allocated to those groups that brought the greatest expertise to the task.

A Watershed Detective Story:

The first comprehensive assessment of the bay came from a wet-weather/dry-weather study conducted jointly by the state DEM's Division of Water Resources and the federal Food and Drug Administration. This assessment identified streams and stormdrains with significant fecal bacterial loadings. However, all measurements were taken at end-of-pipe locations or at stream mouths (U.S. Public Health Service, 1994). As a result, the Greenwich Bay Initiative knew which areas to focus on, but did not know exact sources. Hardig Brook, for example, was found to contribute between 50 to 90 percent of all the fecal coliform loadings, but the origins of those loadings were not known and finding them took significant detective work.

The state DEM/Narragansett Bay Estuary Program targeted Hardig Brook for action and then co-wrote a federal grant proposal with Dr. Ray Wright of the University of Rhode Island (URI) for performing a highly focused study of the Hardig Brook watershed. The proposal was accepted by the U.S. EPA, and the City of Warwick used the DEM agreement with the university to piggyback funds of $100,000 for additional investigation in streams along the northern shore of Greenwich Bay.

As a result of an intensive wet-weather/dry-weather study, Dr. Wright's team was able to identify two major sources of fecal coliform bacteria in Hardig Brook. A mill site had direct discharges from a number of rest rooms that resulted in significant bacterial counts during dry weather. During storms, however, even these figures were dwarfed by fecal inputs further up in the Hardig Brook watershed. More extensive sampling revealed that runoff from a manure storage pile was making its way into a feeder stream and ultimately into Hardig Brook. Dr. Wright's process of isolating potential sources provided a rapid way of accounting for the most significant bacterial pollution entering Hardig Brook on its way to Greenwich Bay. Unfortunately, Dr. Wright's work in the small streams along the north shore was not as conclusive. Those streams had high fecal coliform counts throughout their length as they flowed through high-density residential developments with septic system problems.

Other Technical Assistance:
Most of the endeavors under the Greenwich Bay Initiative rely on a solid technical/scientific basis. For example, the Natural Resource Conservation Service and the Southern Rhode Island Conservation District are providing engineering and communications assistance for the farm runoff problem. For advanced septic system needs, the URI's On-site Wastewater Training Center is evaluating and promoting alternative septic system technologies for pathogen and nutrient removal. URI Sea Grant has also provided oceanographic expertise to address remaining concerns about the bay's nutrient status, bacterial input from a series of stormwater discharges, the bay's currents and circulation as well as management needs. The DEM/Narragansett Bay NEP carried out pilot eelgrass habitat restoration efforts in Greenwich Bay coves as well as providing funding for the development of a shellfish management plan.

Outreach:
Public outreach and education are key components of the Greenwich Bay Initiative. The Natural Resource Conservation Service has focused on youth living in the watershed by providing teacher training for a middle school watershed curriculum. At least two schools are making plans to expand the curriculum across several grade levels. For older students, the DEM/ Narragansett Bay NEP funded a classroom and shoreside program conducted by Save The Bay. Save The Bay also has a very active volunteer habitat and water-quality monitoring program. URI's Coastal Resource Center is reaching out to adults by providing a highly popular intensive training program for municipal board members and other local decision makers.

Finances:
Securing funding for a wide range of protection and abatement activities has been very challenging. To help with funding, the City of Warwick sponsored a $5 million local bond referendum geared toward bay restoration. The R.I. DEM/Narragansett Bay NEP and Save The Bay sponsored a family-oriented "Bring Back the Bay Day" to help get the word out to local residents. Save The Bay also ran a phone bank, which proved critical in making voters aware of the bond. At the final count, voter turnout was twice as large as expected, and nearly 70 percent were in favor of the bay bond.

One million dollars from the bond went to fund the Warwick Sewer Authority's On-site Rehabilitation Program, which provides up to $4,000 to homeowners in a 40:60 grant/loan combination. An additional $1.5 million was set aside for stormwater studies and remediation, and $2.5 million was earmarked for extending sewers through a shoreline area with nearly 1,000 apartment and condominium units all of which currently rely on inadequate septic systems.

The bond funds proved doubly helpful. Not only were they used to expand Dr. Wright's work, but they have also been used as match for a variety of federal funds obtained through different coalition members such as the DEM/Narragansett Bay Estuary Program, the DEM's Nonpoint Source Program, and URI/Sea Grant.

Watershed Benefits:
This case study has shown that a wide range of inter-related issues such as water quality, land use, habitat protection, stormwater management and institutional concerns can be addressed using a watershed approach. As an operational model, it can be used in other states or sub-watersheds.

The cooperative spirit of the Greenwich Bay Initiative has opened up opportunities for public/private partnerships with a corresponding diversity of funding sources. By working together, stakeholders are able to produce hard numbers to support and direct remediation actions with a greater degree of efficiency and effectiveness.

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Working Together to Renew the Milwaukee River Basin

James R. D'Antuono
Wisconsin Department of Natural Resources

Milwaukee, the city with the Indian name meaning- "gathering of the waters," celebrates its 150th birthday this year. It is located in southeastern Wisconsin at the confluence of three rivers (the Milwaukee, the Menomonee, and the Kinnickinnic) which drain into Lake Michigan. The rivers come together in downtown Milwaukee to form a freshwater estuary.

Five hundred miles of streams and more than 100 lakes form the life blood of the drainage area called the Milwaukee River Basin, which encompasses nearly 900 square miles. The drainage basin includes six watersheds and portions of 7 counties, 31 townships, 14 cities, and 23 villages. It is home to more than a million people.

Over the years, the cumulative effects of some unsustainable practices and environmental mistakes have compromised the vitality of our lakes and streams. Twenty-five years ago, many of our major streams and tributaries were overwhelmed by inadequately treated sewage and industrial wastes from treatment plants and industries. Ten years ago, unchecked runoff from hundreds of farms contributed sediment, bacteria, and excessive nutrients to the basin's surface and groundwater resources. Until two years ago, combined sewer overflows in the downtown Milwaukee area gushed millions of gallons of untreated sewage and contaminated stormwater into the basin's three major rivers and Lake Michigan more than 40 times annually. Even today, despite significant, ongoing progress in stormwater management, small rainstorms flush thousands of pounds of pollutants from the basin's 250 square miles of urban areas into waterways.

In the spring of 1993, Milwaukee made headlines when heavy rains and excessively high spring runoff contributed to a catastrophic outbreak of cryptosporidiosis from bacteria contamination of the city water supply. More than 400,000 persons became ill; an estimated 100 died. In response to the 1993 crisis, the Milwaukee Water Works Plant adopted new water quality standards far more stringent than state and federal regulations. The utility put into place new operational methods and monitoring equipment, none of which are required by law. Since then, indicators of water quality have surpassed state and federal standards on a daily basis. There has not been a recurrence of waterborne disease in Milwaukee.

Ultimately, the best protection against water contamination crises such as the 1993 outbreak of cryptosporidiosis is comprehensive watershed protection. In the Milwaukee River Basin, through a multi-faceted watershed program, we are making exemplary progress in controlling runoff pollution; at the same time, we are upgrading control of point-source pollution. In Wisconsin, the beginnings of a priority watersheds program date back to 1978, when the concept of identifying and targeting major sources of polluted runoff was introduced by the Wisconsin Department of Natural Resources (DNR) water resources management program. At present, the priority watersheds program is going strong, working in cooperation with many local units of government.

Citizen Involvement and Public Education:

Since 1985, citizen advisory groups have served as partners with the DNR in preparing plans and implementing programs which stress cost-effective means for improving water quality. The DNR has relied upon more than 350 people to play active roles on the ten committees formed to develop management plans for the basin's six watersheds. The University of Wisconsin-Extension played a key role in the early phases of the project. Today, their assistance in developing and implementing rural and especially urban information and educational programs is indispensable.

A highlight of the basinwide education effort has been the ongoing Testing the Waters program. Since 1990, more than 15,000 students from 37 high schools have collected water quality information at 40 locations. Officials from many communities participate in an annual spring meeting where solutions to pollution problems are discussed with the students.

Point Source Pollution Control:

All of the basin's sewage treatment plants either have been or are in the process of being upgraded to meet at least secondary levels of treatment. In October 1994, the City of Milwaukee became the first community in the Great Lakes area to be permitted under the municipal stormwater provisions of the Clean Water Act. The city's management program under the permit includes following pollution prevention measures, upgrading urban housekeeping practices, conducting monitoring, constructing best management practices, and implementing a stormwater management education campaign.

The Milwaukee Metropolitan Sewerage District (MMSD) provides wastewater treatment for most of the Milwaukee area. The highlight of the MMSD water pollution abatement program is the 17 miles of deep

tunnel lying 300 feet beneath the Milwaukee, Menomonee, and Kinnickinnic Rivers. The tunnel can store up to 400 million gallons of combined sewer overflow until it can be pumped to treatment plants. Since early 1994, the tunnel system has kept 17 billion gallons of combined sewer overflow from reaching the rivers and Lake Michigan.

Nonpoint Source Pollution Control:

The six watersheds in the Milwaukee River basin were designated as priority areas in 1984, under the Wisconsin DNR's nonpoint source pollution abatement program. The planning process resulted in a comprehensive evaluation of all rural and urban nonpoint pollution sources. More than 1,200 farms were identified as contributing significant amounts of pollution to the wetlands, streams, lakes, and groundwater. Runoff from about 150 square miles of existing and planned urban land uses was also identified as a critical source of pollution in 30 of the basin's 37 communities.

A decade later, we have achieved unparalleled cooperation in controlling runoff pollution. Rural nonpoint source pollution has been greatly reduced on nearly half of the problem areas identified at the beginning of the project. This reduction has been achieved by preparing and following nutrient management plans, constructing barnyard and manure management systems, and improving farming practices. The DNR has contributed more than $6 million to provide local staff, technical assistance, and cost sharing for design and installation of practices. Landowners have contributed about $2 million in matching funds or in-kind contributions.

Participation in efforts to curtail urban runoff pollution has been equally strong. Twenty-seven of the basin's 30 communities with land uses contributing significant runoff pollution problems are participating. Nearly $10 million dollars has been invested by the DNR, and local government entities have contributed an additional $3 million in matching funds.

Urban runoff controls have emphasized three areas: adopting and enforcing construction site erosion control ordinances, conducting information and education programs, and implementing improvements in urban housekeeping activities such as street sweeping, catch basin cleaning, and vehicle maintenance. In developing areas, we are focusing on stormwater management planning and adoption of ordinances to regulate water quality and quantity.

Stormwater management plans have been prepared for about one third of the urban area. An estimated 3,000 feet of streambank have been stabilized. Two dozen structural best management practices including detention ponds, infiltration devices, multi-treatment tank systems, and artificial wetlands have been constructed.

Habitat Restoration:

Aquatic habitat restoration efforts have focused on portions of streams impounded by the more than 50 dams in the basin. The DNR has worked with local units of government to identify opportunities for

removing dams. Currently we have assisted in the removal of three dams. More than three river miles of impounded water is now flowing free once again. Nearly 200 acres of new upland and wetland habitat have been created. Water quality has improved dramatically, and native fish populations are returning.

Wetland and upland habitat restoration efforts have focused on integrating the priority watershed project with federal conservation reserve and wetland restoration programs. In addition, we are cooperating with a number of nonprofit organizations to provide grant funds to purchase land or conservation easements along tributaries and in upland areas.

In-Place Pollutant Management:

Contaminated sediment has been a significant pollution source throughout the basin. In 1994, the DNR, the City of Cedarburg, and an industry cooperated to remove approximately 9,000 cubic yards of sediment highly contaminated with polychlorinated biphenyls (PCBs) from Cedar Creek. This major tributary of the Milwaukee River was suspected of carrying PCBs downstream.

A PCB mass balance study and sediment mapping project are underway for the Milwaukee River. Sediment contamination in downstream areas is being characterized and measured through development of a geographic information system. This will be an important tool in selecting and implementing cost-effective remediation solutions.

A Clean Water Future:

Efforts to restore the Milwaukee River Basin are continuing. The water quality in the basin is improving, and this improvement is being recognized. Last year, the City of Milwaukee committed $10 million dollars for further development of the downtown riverwalk along the Milwaukee River.

As mentioned earlier, the city of Milwaukee has been under a stormwater permit since 1994. The newest challenge facing managers in the basin will be the start of stormwater permitting in the greater Milwaukee metropolitan area. Because of interconnecting municipal separate storm sewer systems and upstream discharges into the greater Milwaukee River basin, we are concerned that some southeast Wisconsin municipalities may be significant contributors to stormwater discharges. During August 1996, the Wisconsin DNR, through a partnership process, began designating 21 southeastern Wisconsin communities to participate in the municipal stormwater discharge permit program. Letters have been sent to the mayors of these communities advising them of next steps toward implementing the program.

Note: This information is provided for reference purposes only. Although the information provided here was accurate and current when first created, it is now outdated.

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Achieving Results Community By Community: A National Satellite Video Conference
Wednesday, June 12, 1996

The Henry's Fork Watershed

Janice Brown
Henry's Fork Foundation, Dale Swensen, Fremont-Madison Irrigation District

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Located in eastern Idaho and western Wyoming, the Henry's Fork watershed covers 1.7 million acres and includes part of Yellowstone National Park and the western slope of the Teton Mountains. It is laced with more than 3,000 miles of rivers, streams, and irrigation canals. High mountain streams and abundant spring sources provide nutrient-rich waters of constant flow and temperature. These conditions sustain healthy populations of fish and wildlife, including several threatened and endangered species.

Three Idaho counties Fremont, Teton, and Madison and Wyoming's Teton County lie within the Henry's Fork basin. The combined population of these counties is 40,000. The basin was originally settled by Mormon and Lutheran homesteaders who built irrigation canals and storage reservoirs to augment the water supply. Existing canals divert water from Henry's Fork, the Fall River, the Teton River, and smaller tributaries, and irrigation water is stored in dams built on Henry's Lake, Henry's Fork, and the Fall River.

Agriculture is important in the Henry's Fork Basin; the primary crops are potatoes and grains. More than 235,000 acres of farmland are irrigated using surface or ground water sources in the basin. Recreation and tourism are also important sectors of the economy that depend heavily on the basin's water resources. Other sources of employment and income include government and the timber products industry. In recent decades, these different sectors were increasingly separated by conflict over water resource management issues. On the one hand were hydropower requirements and increasing demands for irrigation water; on the other hand, fisheries and recreation-based businesses depended on in-stream flow for their continued existence.

In 1993, the Idaho Legislature passed the Henry's Fork Basin Plan as a framework for dealing with these controversial issues. As a result of the plan, new developments such as dams, diversions, and

hydroprojects were prohibited on 195 miles of the Henry's Fork and its tributaries. Recommendations in the plan dealt with water quality, fish and wildlife protection, and irrigation water conservation.

As a means of implementing the recommendations and achieving long-term goals in the basin, an innovative, consensus-building process was developed so that all parties with interests in the watershed could be included in decision making. At least 25 federal, state, and local agencies were found to have management or regulatory jurisdiction in the Henry's Fork Basin a situation that contributed to fragmented planning and decision making. Lack of agency coordination was hindering progress in addressing soil erosion, water delivery, and water quality problems, thereby worsening rather than solving problems arising from the sector divisions in the basin. To turn this situation around, citizens and agency representatives began, in 1993, to craft a new, nonadversarial approach to reconciling watershed issues in the Henry's Fork Basin.

Over the winter of 1993-94, the Henry's Fork Watershed Council was organized and chartered by the 1994 Idaho legislature. The charter identifies four major duties for the Henry's Fork Watershed Council:

- Cooperate in resource studies and planning that transcend jurisdictional boundaries, still respecting the mission, roles, and water and other rights of each entity.
- Review and critique proposed watershed projects and Basin Plan recommendations, suggesting priorities for their implementation by appropriate agencies.
- Identify and coordinate funding sources for research, planning, and implementation, and long-term monitoring programs, with financing derived from both public and private sectors.
- Serve as an educational resource to the state legislature and the general public, communicating the council's progress through regular reports, media forums, and other presentations.

The council's mission statement was fashioned by consensus and reads as follows:

The Henry's Fork Watershed Council is a grassroots, community forum which uses a nonadversarial, consensus-based approach to problem solving and conflict resolution among citizens, scientists, and agencies with varied perspectives. The Council is taking the initiative to better appreciate the complex watershed relationships in the Henry's Fork Basin, to restore and enhance watershed resources where needed, and to maintain a sustainable watershed resource base for future generations. In addressing social, economic, and environmental concerns in the basin, Council members will respectfully cooperate and coordinate with one another and abide by federal, state, and local laws and regulations.

The Henry's Fork Watershed Council is comprised of citizens, scientists, and agency representatives who reside, recreate, make a living, and/or have legal responsibilities in the basin, thus ensuring a collaborative approach to resource decision making. The number of participants in the council is not limited. Participating members are organized into three component groups:

- Citizens' Group: Members of the public with commodity, conservation, and/or community development interests have an integral role in council affairs by being on equal footing with other

participants. The citizens' group reviews agency proposals and plans for their relevance to local needs and whether all interests are treated equitably.

- Technical Team: The team is composed of scientists and technicians from government, academia, and the private sector. The team's role is to serve as resource specialists for the council, coordinating and monitoring research projects, launching needed studies and reviewing any ongoing work in the basin. Duplication of research is minimized through technical team guidance; the results of research is to be integrated into council discussions.
- Agency Roundtable: The roundtable has representatives of all local, state, and federal entities with rights or responsibilities in the basin, including the Shoshone-Bannock Tribes. The agencies are working to align their policies and management to watershed resource concerns and needs. Discussions seek to ensure close coordination and problem solving among agencies, as well as to clarify legal mandates of each entity.

Two representative citizen organizations from the basin have been selected to co-facilitate the council meetings: the Fremont-Madison Irrigation District and the Henry's Fork Foundation. This Facilitation Team is chartered to attend to administrative and logistical needs of the council, coordinate its public information activities, and submit an annual report of its progress to the legislature. The Henry's Fork Watershed Fund has been established by the State of Idaho to help fund projects in the basin and to defray administrative expenses of the council.

Information sharing is key to the work of the council. A Watershed Resource Center is being established in a local community, in the heart of the basin, to provide a central library, database repository, and working place for all those participating in the collaborative watershed program. The center will also support the public's need for watershed information and serve as a focal point for council business. In the meantime, information concerning the council and its progress may be obtained from either of the two co-facilitating organizations:

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Achieving Results Community By Community: A National Satellite Videoconference
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The Seco Creek Watershed

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The Seco Creek Water Quality Demonstration Project (WQPD), established on April 9, 1990, comprises 170,670 acres approximately 50 miles west of San Antonio. It is a cooperative resource management initiative created through a partnership between the U.S. Department of Agriculture (USDA), the state of Texas, and others. Project personnel come from the Texas Agricultural Extension Service and the USDA Natural Resources Conservation Service. The Consolidated Farm Service Agency, the Texas State Soil and Water Conservation Board, and 22 other participating local, state, and federal agencies, groups, and universities also contribute to the effort. Project staff work with landowners to encourage them to adopt best management practices (BMPs) to conserve water, enhance recharge of the Edwards Aquifer, reduce polluted runoff, and improve water quality in the watershed.

Within the boundaries of the project are 32,500 acres of Edwards Aquifer recharge zone, which provide approximately eight to ten percent of the total recharge for the aquifer; the Edwards Aquifer provides water to about 1.5 million people daily. Soil and water conservation practices demonstrated in the Seco Creek WQPD have a direct influence on the water quality and yield of the aquifer as well as on surface water quality from the Edwards Plateau to the Gulf of Mexico. These BMPs affect water resources in the entire state both directly and indirectly.

All of the land in the Seco Creek Project is privately owned. Landowners have voluntarily installed over 450 examples of about 60 BMPs. At least one conservation BMP is being applied in 76 percent of the project area. In some cases, landowners are receiving cost-share assistance from cooperating agencies; in other cases, only technical assistance is being provided.

Cropland practices now in place include nutrient management, integrated crop management, and crop residue management. In addition, filter strips and crop residue management have increased water infiltration and decreased runoff carrying sediments, pesticides, and nutrients. Filter strip areas with good vegetative cover have reduced sediment production to less than 3 percent of that in adjacent fields with a 30-percent residue cover. To help improve nutrient management, more than 500 soil analyses have been conducted free of charge. Soil moisture is being monitored; to ensure timely irrigation with minimum waste of water, existing systems are being converted to more efficient, fine-tuned irrigation technology such as surge flow and low-energy precision application. Nitrogen applications have decreased by approximately 500,000 pounds in the project area. Runoff-related losses of nutrients and pesticides from cropland have decreased by 27 percent, and leaching losses have decreased by an estimated 40 percent.

Rangeland makes up about 83 percent of the land in the Seco Creek WQPD. For this reason, many of our project activities are directly related to improving water quality in rangeland streams and promoting aquifer recharge on rangelands. On roughly 80 percent of this rangeland, BMPs are being employed, including grazing management, riparian management, brush management, spring enhancement, water development, cross fencing, and wildlife habitat management.

As an alternative to herbicide use, brush management techniques including mechanical methods and prescribed fire are being evaluated in terms of their efficacy in controlling woody species, enhancing herbaceous production, increasing infiltration, and decreasing runoff and erosion. Other BMPs are in place to benefit wildlife, including food plots and water sites, which can reduce the time wildlife species spend in riparian zones. One ongoing project is demonstrating the comparative impact of different grazing and management strategies on vegetative production, carrying capacity, water infiltration, and soil moisture. Another project is evaluating different types of grasses as options in scenarios for optimum rangeland management.

Planned and recently implemented demonstrations for grazing land include: employing new livestock watering technology to improve riparian area management; testing the effects of woody plant density on soil moisture and herbaceous production; and using individual plant herbicide treatments (as opposed to broadcast application) to control the density and distribution of woody plant species and shape the plant community to benefit hydrologic functions in the watershed and also better support wildlife.

New demonstrations planned for the coming year for cropland feature minimum-till and no-till farming to reduce erosion and sediment production, and plant tissue analysis as a tool for nutrient management.

To demonstrate how urban water users can conserve water and decrease chemical runoff from lawns

and residential landscapes, a project demonstrating differences in water and chemical use between native buffalo grass and St. Augustine grass lawns was initiated last year. This project included several conventionally landscaped yards and four buffalo grass lawns. Results indicate that, for many homeowners who want a low-maintenance lawn with low water requirements, buffalo grass can be a wise choice. More volunteers are being recruited so that potential benefits and appropriate uses of this species can be more fully assessed.

Two separate projects have evaluated ways to increase water yield from rangeland watersheds through vegetation management. The first part of a research study conducted by Bill Dugas, Texas Agriculture Experiment Station, calculated water use of woody species. Data show that a 10-foot-tall Ashe Juniper uses an average of 10.5 liters of water per day. The second part of the study compared the evapotranspiration from a site where Juniper was removed to a control site with Juniper left in place. Data collected over three years show an average increase in water yield for potential aquifer recharge of approximately 40,000 gallons per acre annually after Ashe Juniper were removed. At a similar demonstration site, annual spring flows increased by about 30,000 gallons per acre of watershed following removal of approximately 80 percent of the Juniper.

Two projects will begin this year in cooperation with the Texas Agricultural Experiment Station. One will measure changes in water yield over time as a result of increased generation of Juniper seedlings, improved herbaceous cover, and the compensatory responses of other woody vegetation following Juniper control. The other study, which is part of an international research effort, will determine how certain physical characteristics of plants vary in response to different grazing pressures.

Ten water and sediment control structures have been installed in the Seco Creek Project area. One of these sites is increasing aquifer recharge by .09 acre-feet per inch of rain that falls on its 40-acre watershed. Currently, four underground water conservation districts in the region are considering installing similar structures to improve water quality and quantity.

Surface and ground water quality and quantity are being monitored by the U.S. Geological Survey through a cooperative agreement with the Texas State Soil and Water Conservation Board. Eleven precipitation stations, nine stream gauges, four automatic stream samplers, and one independently sampled surface water site provide data on water quantity and quality. Ground-water samples have also been collected from 25 shallow wells in the Leona and Escondido formations and from eight deeper Edwards aquifer wells. In addition to measuring for the impacts of BMPs, the samples are intended to describe the interactions between surface water and ground water in the area. To date, sample analyses have shown no surface water quality problems and no contaminants in excess of EPA drinking water standards. The diversity of nonvertebrate benthic organisms in the stream channel has also been monitored as an indicator of water quality. To date, no water quality degradation has been found.

The Seco Creek WQDP sponsors a great many information outreach and educational activities including news articles, videos, field days, tours, program presentations, exhibits, and youth education camps. More than 300 tours, programs, and exhibits have reached over 100,000 people. Four youth education

programs have involved 75 area youth in resource conservation. This year, project personnel are working on an educational exhibit and materials to be presented at the next San Antonio Livestock Exposition. In addition, they are cooperating with the Edwards Underground Water District, the Texas Natural Resources Conservation Commission, and Kelly Air Force Base in the Groundwater Guardians Program, an educational program to increase awareness of ground-water conservation issues. They are also working with the Medina Ground Water Conservation District and Medina Electric Cooperative to educate fourth-grade students on what they can do to conserve water at home.

The Seco Creek WQPD is a working example of how an integrated, cooperative approach can promote voluntary adoption of best management practices that protect water quality, improve water yield, and conserve water resources. For their efforts and dedication, project personnel earned the 1994 State of Texas Governor's Award for Environmental Excellence in Agriculture. In 1995, they received the USDA Group Honor Award for Excellence, and in 1995 and 1996, they earned a Certificate of Environmental Achievement from the National Awards Council for Environmental Sustainability. Several factors contribute to the project's success including: respect for landowner property rights on the part of project personnel; an enthusiastic and cooperative attitude on the part of property owners; excellent cooperation between the primary agencies; and an excellent information and education program.

As a practical matter, Texas Agricultural Extension Service and Natural Resources Conservation Service personnel are housed in the same office, which facilitates assistance to landowners as well as good communication and coordination between representatives of each agency. By providing an example of effective resource management, project personnel and landowners hope to help other residents of the state to protect and conserve soil and water resources for future generations of Texans.